FRITZ J. FRANK
President

J. H. VAN DEVENTER
Editor

C. E. WRIGHT, *Managing Editor* | J. A. ROWAN, *News Editor* | A. I. FINDLEY, *Editor Emeritus*

R. E. MILLER, *Machinery Editor* | F. J. WINTERS, *Art Editor* | T. W. LIPPERT, *Metallurgical Editor*

Associate Editors
F. J. OLIVER | W. A. PHAIR | G. RICCIARDI

F. JURASCHEK
Consulting Editor

Washington Editor
L. W. MOFFETT

Resident District Editors
T. C. CAMPBELL, *Pittsburgh* | ROBERT G. BINGHAM, *Chicago*
D. R. JAMES, *Cleveland* | W. F. SHERMAN, *Detroit*

Editorial Correspondents
F. B. RICE-OXLEY, *London, England* | ROBERT G. McINTOSH, *Cincinnati*
G. FRAZAR, *Boston* | P. FIDRMUC, *Hamburg, Germany*
L. E. MEYER, *Milwaukee* | CHARLES POST, *San Francisco*
F. SANDERSON, *Toronto, Ontario* | ASA ROUNTREE, JR., *Birmingham*
LEROY W. ALLISON, *Newark, N. J.* | ROY M. EDMONDS, *St. Louis*
F. T. TURNER, *Buffalo*

★

Owned and Published by

CHILTON COMPANY
(Incorporated)

Publication Office
Chestnut and 56th Sts.,
Philadelphia, Pa.

Editorial and Executive Offices
239 West 39th St.,
New York, N. Y.

OFFICERS AND DIRECTORS

C. A. MUSSELMAN, *President*
FRITZ J. FRANK, Executive Vice-President
FREDERIC C. STEVENS, Vice-President
JOSEPH S. HILDRETH, "
GEORGE H. GRIFFITHS, "
EVERIT B. TERHUNE, "
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JOHN H. VAN DEVENTER
JULIAN CHASE
THOMAS L. KANE
CHARLES S. BAUR
G. CARROLL BUZBY
P. M. FAHRENDORF

★

C. S. BAUR, *General Advertising Manager*
A. H. DIX, *Manager Reader Service*

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents; this copy $2.00. Cable Address, "Ironage, N. Y."

ADVERTISING STAFF

Emerson Findley, 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Chestnut & 56th Sts., Philadelphia, Pa.
H. K. Hottenstein, 802 Otis Bldg., Chicago
H. E. Leonard, 239 W. 39th St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.

THE IRON AGE

Contents

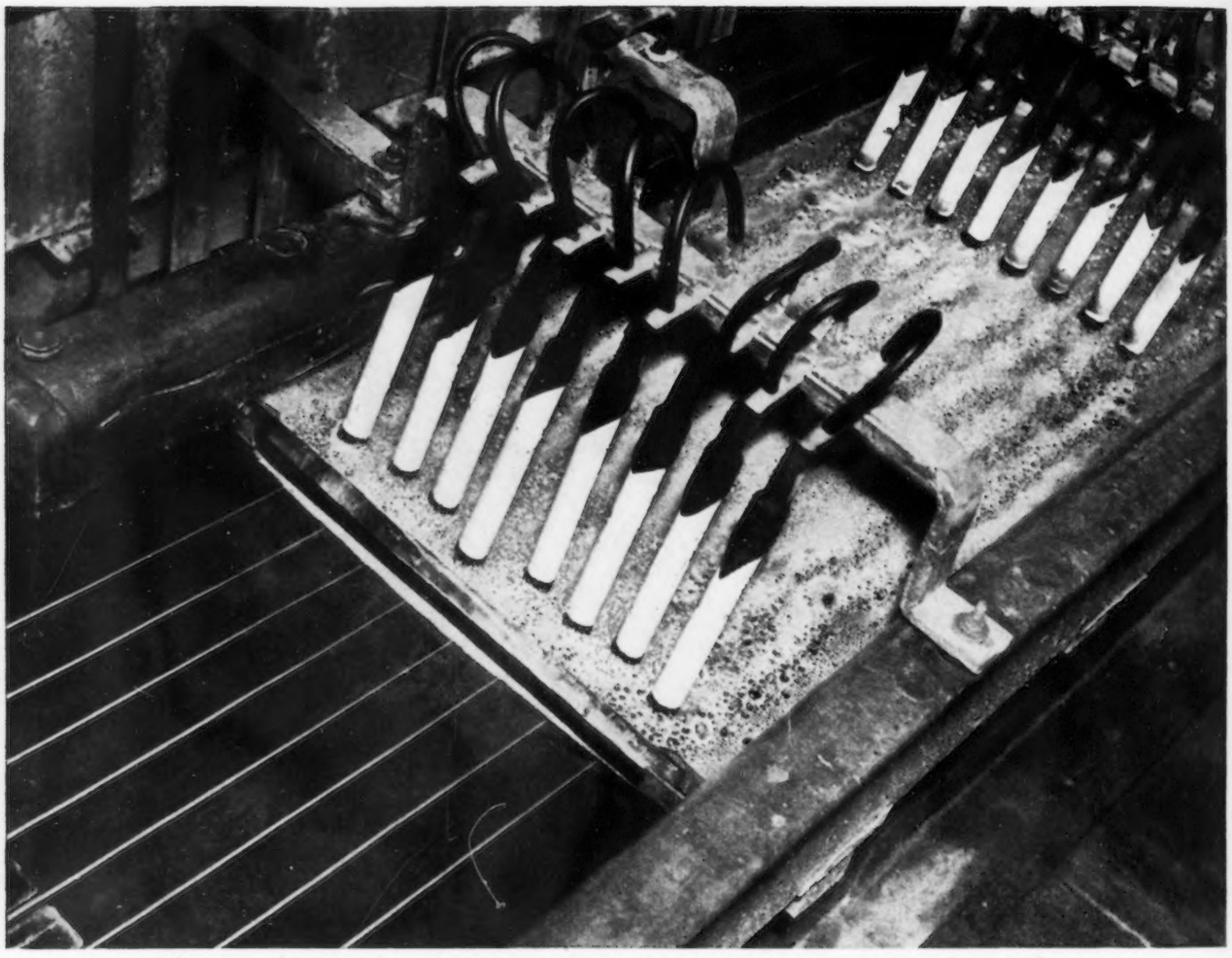
DECEMBER 30, 1937

A Twenty-Five Billion Dollar Job 21
Structural Steel "Flame Softened" During Gas Cutting ... 22
Modernization at Wisconsin Steel 31
Odd Jobs Handled Economically By Hoists and Cranes ... 36
Automotive Industry 42
Statistics on Metal-Working Activity 46
Rate of Activity in Capital Goods 47
Washington News 48
NEWS CONTENTS 54
Plant Expansion and Equipment Buying 83

▼ ▼ ▼

New Industrial Literature 16
Just Between Us Two 88
Products Advertised 88
Index to Advertisers 114

Copyright 1937 by Chilton Company (Inc.)



Close-up of bethanizing cell, showing wire passing through the clear bethanizing solution.

A bethanized zinc coating is *inevitably* of uniform thickness

THE LASTING qualities of zinc-coated wire depend on the uniformity of the coating as well as on the weather resistance of the zinc and the weight applied. If the coating is of uneven thickness, its effective life is no longer than that of the thin spots.

In the bethanizing process the zinc is put on the wire by the flow of electricity as the wire passes through a solution. Since the current flows equally into all points of the surface the amount of zinc deposited is the same all over the surface. The fact is, we couldn't put on an uneven bethanized coating if we wanted to.

The inevitable uniformity of the coating is but one of the salient features of bethanized wire. This, plus the 99.99 per cent purity of the zinc coating and the fact that it endures virtually any fabricating operation, has enabled bethanized wire to stand up under conditions so severe that zinc-coated wire was never before even considered.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

▲ ▲ ▲ THE IRON AGE ▲ ▲ ▲

December 30, 1937

ESTABLISHED 1855 Vol. 140, No. 27

A Twenty-Five Billion Dollar Job?

HOW much would have to be invested in private industry to create new jobs for 3,000,000 workers in manufacturing industry? Lammot du Pont, president of E. I. du Pont de Nemours & Co., told the National Association of Manufacturers' convention delegates that it would be $25 billions. This is figuring on a generally accepted basis of an investment of $8,000 per worker.

Business could probably raise that amount, said Mr. du Pont, "if given a reasonable degree of certainty" regarding the future attitude of Government toward it.

Assuming that Government would give business some assurance of stability of attitude, and that business could create the 3,000,000 new jobs in industry by investing that money, who would put the other 6,000,000 idle people to work? And would it require a proportionate investment amounting to $50 billions additional? Would that mean Government pump priming to the tune of $50 billions more, with tremendous increase in taxation to provide the fund to avoid an overwhelming national debt increase?

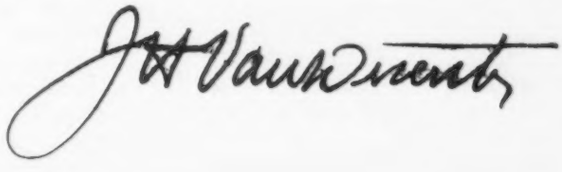
That question is undoubtedly being asked by a good many who have read the newspaper accounts of Mr. du Pont's address. Neither the newspapers nor the general public is likely to take cognizance of what is known as "secondary employment," although Mr. du Pont's audience of manufacturers was well acquainted with it.

By secondary employment is meant the creation of new jobs inside as well as outside of particular manufacturing industries by the creation of new jobs inside of them. In the automobile industry, for example, the putting to work of each man engaged in making motor cars created new jobs for 8½ men in building construction, machine tool making, the oil and tire business, improved road building and a hundred other occupations down to roadside hot dog stands. This is an extreme case, but it can be conservatively figured that in general one new job in industry creates at least two more.

Mr. du Pont believes that we could eliminate unemployment altogether (except of course for the inevitable residue of unemployables), through such an investment of $25 billions by private capital. He writes us as follows:

"You are wholly correct in the assumption that the creation of 3,000,000 new jobs in manufacturing industry would result in the secondary employment of double that number or more in the service and other industries and, as far as can be guessed from the present inexact knowledge of the state of unemployment, would take up all of the existing slack between employable workers and jobs, including the workers now employed who might be displaced by the introduction of new products."

In the course of 30 years, Henry Ford, through an original investment of $10,000 has provided jobs for nearly 100,000 workers. Industry is a fertile producer of jobs when profits are permitted to be plowed back into it.



Structural Steels "Flame Softened" During Gas Cutting--I

By H. H. MOSS
Development Engineer, The Linde Air Products Co., New York

IN flame cutting of steel, a hardened zone is left on the outside edge. With ordinary steels of 0.30 carbon and under this sorbitic hardness is not intense, and so no difficulty is experienced in bending or fabrication. But with high carbon and alloy steels precautions have to be taken to remove the hardened edge—either by a subsequent annealing treatment or by machining.

A method and equipment for "flame softening" such steels, either air or quench hardening, during cutting and without further processing, are described in this article, which is from a paper on "Cutting and Tempering Structural Steels," presented by Mr. Moss at the recent 38th annual convention of the International Acetylene Association. The remainder of Mr. Moss' paper, dealing chiefly with macroscopic and microscopic examination of the heat affected zone of plain and "flame softened" cuts, will appear in a forthcoming issue.

THERE are few ferrous metals which do not respond readily to flame cutting, and most of them, particularly those commonly used for structural purposes, contain sufficient combustible matter to permit straight line progressive applications of the cutting flame. This is the common method with which we are all more or less familiar.

From a purely cutting standpoint this facility provides a simple and economical production tool for shaping steel. On the other hand, all grades of steel do not react the same way physically in going through the cutting process, taking on properties in the cut surfaces differing from those initially present in the steel. This is more or less true also of mechanical severing and shaping operations such as sawing, planing and shearing, and is a matter which must be appraised before cutting, first to determine whether the altered properties fall within the required specifications governing the objective of the steel in question, and if they do not, secondly, to provide means for either avoiding the trouble or removing the undesired properties.

No Difficulty With Ordinary Steels

The behavior of steel in this respect and certain remedial procedures, have been discussed, therefore, from a flame cutting standpoint, before the International Acetylene Association on many occasions, and we are reminded particularly of the recommendations of L. M. Curtis at the 32nd Annual Convention of the association at Chicago, Nov. 11, 1931. In a paper on "Machine Gas Cutting Heavy Plate," he pointed out that the physical and chemical changes produced by the cutting operation leave a thin, hardened zone on the outside edge, the penetration of which is usually superficial, and that with ordinary steels of 0.30 per cent carbon and under, no par-

ticular difficulty is experienced in bending or fabricating, as the sorbitic hardening is not intense, whereas with high carbon and alloy steels, the precautions of annealing or machining should be used to remove the hardened edge.

The line of demarcation in applied flame cutting where real damage begins to take place for the various grades of steel now on the market has not been accurately or fully determined to the author's knowledge, nor can it be gaged by a single yardstick. From the structural standpoint, it is required that the flame-cut metal satisfactorily pass the standard tests prescribed for the parent metal. This calls for liberal ductility and the retention of other properties within specified limits. In other cases, however, it may be required only that the flame-cut metal be machinable.

Where the part is to be subjected to furnace treatment soon after cutting, and the rigidity of the part is such that handling operations do not induce important flexural stresses in the cut surfaces, it may only be required that the flame-cut metal be sufficiently ductile to prevent microscopic or visible surface checking or cracking during cooling following cutting. For the plain carbon structural steel of normal manganese content, such as A-7 and A-9 grades, the line of demarcation under standard ASTM specifications seems to run between 0.30 to 0.35 per cent carbon above 32 deg. F.

Several of the so-called low alloy high strength structural steels go through the process of flame cutting quite satisfactorily at normal temperatures, such as the low manganese silicon structural steels in gages not exceeding ⅝-in., providing the carbon content is likewise on the low side. The low-carbon chrome-phos steels and other steels in this class employing small amounts of nickel and molybdenum in the lighter gages are not seriously affected by flame cutting.

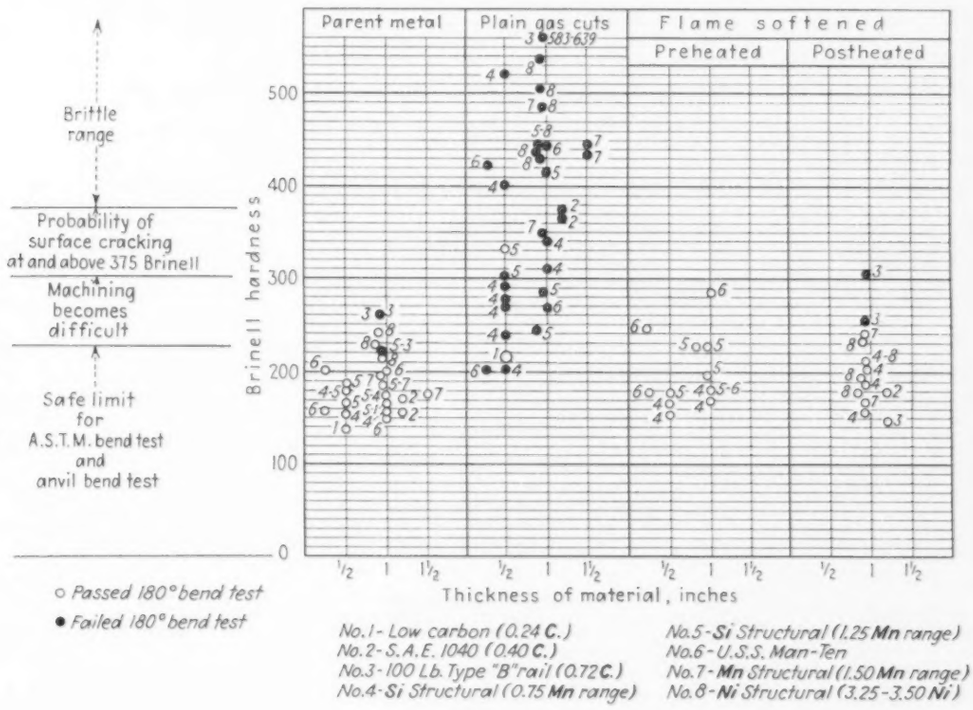


FIG. 1—A graphic presentation of the hardness data for eight of the steels listed in Table No. 1.

Carbon and Low Alloy Steels

A fairly good picture of the effect of flame cutting on the physical properties of metal in and marginally below the cut surfaces in a number of popular grades of carbon and low alloy steels may be obtained from Table No. 1. The data for this table rest upon average production workmanship for machine flame cutting.

Due to the highly marginal depth of the zone affected by the flame cutting operation, of the order of 1/32 to 3/32-in. below the surface for machine cutting, the comparison of physical properties as between uncut and cut metal has necessarily been made on the basis of superficial tests. The comparisons are expressed in terms of hardness and bendability of the metal in the affected zones. Microscopic examinations were also made. The findings are reported in detail elsewhere in this paper.

Unfortunately, there have not been opportunities to perform the cutting tests over the complete range of temperatures in which steels are commonly fabricated. The tests being conducted at the normal temperatures of the laboratories and fabricating shops where this work was carried out, with one or two exceptions as noted in the paper, increased hardening can be expected when the steels are cut at lower temperatures, and vice versa.

In the column of Table 1 headed "Plain Gas Cuts" it will be seen that as the nominal strength of the steels increases, the hardness of the gas cut surface increases somewhat correspondingly, how-

ever, in a higher order of hardness. Plain carbon steel, on the low carbon side, is seen to pass through the cutting process satisfactorily. The degree of hardening has not been sufficient to prevent a satisfactory cold bend. Reference is here made to the work of Prof. J. H. Zimmerman on "Plain Low Carbon Steel" at the Massachusetts Institute of Technology, 1934 and 1935, reported to the I.A.A. at its 35th and 36th annual conventions, from which the data for the low carbon steels were obtained.

Hardness Data for Eight Steels

Similar credit can be given to some of the grades in groups B and G. The degree of hardening is seen to range from that amenable to bending as prescribed by applicable standard specifications to a very hard stage characterized by extreme brittleness. The relationship in this respect is shown graphically on the left-hand side of Fig. 1 for eight grades of steel listed in Table No. 1.

The plotted data regard the

TABLE

PROPERTIES OF PLAIN GAS-CUT AND FLAME-SOFTENED GAS-

GROUP AND GRADE	AVERAGE CHEMICAL ANALYSIS									AVERAGE PHYSICAL PROPERTIES			
	Analysis	C	Mn	Si	P	S	Cu	Ni	Cr	Thickness in Inches	Yield Pt. # p.s.i.	Ult. Tens. # p.s.i.	% Elongation 2" 8"
A. *Carbon Steels*													
Low Carbon(1)	L.A.	0.24	0.46	0.10	0.017	0.033				1/2	35,700	61,400	30
SAE #1040	M.A.	0.40	0.57	0.10	0.02	0.04				1-3/8	52,000(4)	85,000(4)	26(4)
High Carbon	M.A.	0.70	0.77	0.24	0.033	0.032				4-1/8	(None reported)		
100# Rail	—	(None reported)—(.70 C. assumed)								9/16 at cut	(None reported)		
100# ARA Type B Rail	L.A.	0.72	0.73							7/8 " "	(None reported)		
B. *Silicon*													
Low Mn. Structural(11)	M.A.	0.28	0.71	0.21						1/2 & 1-1/16	(None reported)(13)		
" (11)	M.A.	0.28	0.675LA	0.21						1/2	(None reported)(13)		
" (11)	M.A.	0.28	0.685LA	0.21						1-1/16	(None reported)(13)		
"	M.A.	0.28	0.71	0.21						1	(None reported)		
"	L.A.	0.30	0.73	0.26						1-1/16	(None reported)		
"	L.A.	0.31	0.73	0.25						1/2	(None reported)		
"	M.A.	0.33	0.73	0.276	0.018	0.035	0.21			7/8	49,800	85,525	23.4
"	L.A.	0.36	0.70	0.23						7/8	(None reported)		
"	M.A.	0.38	0.86	0.312	0.021	0.034				7/8	50,340	92,990	21.0
Med. Mn. Structural	L.A.	0.26	1.28	0.22						1/2	(None reported)		
" (12)	M.A.	0.26	1.23	0.23	0.019	0.024				1/2	54,900	87,890	21
" (12)	M.A.	0.273	1.22(6)	0.25	0.020	0.026				7/8 & 15/16	50,515	88,140	20.45
" (12)	M.A.	0.29	1.23(7)	0.247	0.028	0.033				5/8 & 3/4	58,720	88,120	22.7
C. *Manganese*													
Abrasive Resistance	M.A.	0.39	1.30	0.18	0.02	0.04				5/8	(None reported)		
U.S.S. Man-Ten	M.A.	0.30	1.43	0.216	0.030	0.034				1/4	59,300	90,640	37 21
Structural	M.A.	0.33	1.43	0.196	0.028	0.027				7/8	68,040	97,700	18.3
U.S.S. Man-Ten	M.A.	0.29	1.55	0.252	0.022	0.025				1	60,350	89,500	40. 23.7
Structural	L.A.	0.27	1.61	0.13						1-1/2	58,600(8)	101,600(8)	19.5(8)
D. *Silico-Manganese*	M.A.	0.40	1.51	2.00	0.018	0.028				3-1/16	(None reported)		
E. *Nickel*													
Structural	M.A.	0.29	0.66	0.124	0.037	0.020		3.32		7/8	64,150	99,420	16.7
"	M.A.	0.31	0.66		0.017	0.025		3.39		3/4	(None reported)		
"	M.A.	0.33	0.71		0.025	0.025	0.26	3.21		3/4	64,370	104,150	18.0
F. *Chrome-Nickel*	M.A.	0.28	0.23	0.076	0.014	0.021		3.29	1.29	2	(None reported)		
G. *U.S.S. Cor-Ten*	M.A.	0.07	0.15	0.72	0.12	0.018	0.44		0.70	1/4	56,380	71,960	49 30
	M.A.	0.10	0.20	0.728	0.131	0.021	0.41		0.88	1	50,420	74,100	45 26.2

M.A. = Mill Analysis
L.A. = Lab. Analysis (UC&C Res. Labs)
C.B. = Cold bend in degrees of bend
F.B. = Free bend in % elongation
A.B. = Anvil bend in degrees of bend
pre. = Simultaneously preheated—Type I treatment
post = Simultaneously postheated—Type I treatment
I.P. = Independent postheat—Type III treatment

NOTES:

(1) Properties reported by J. H. Zimmerman: "A Comparative Study of Cutting Methods as Applied to Structural Steel." I.A.A. Proceedings for 1934.
(2) Direction of rolling: longitudinal.
(3) Direction of rolling: transverse.
(4) Nominal for natural hot rolled plate.
(5) Hardness effected by annealing action of preheating flames of the cutting nozzle.
(6) Lab. analysis: 7/8"—1.09% Mn., 15/16"—1.13% Mn.
(7) Lab. analysis: 3/4"—1.185% Mn.

range of hardness for each steel according to the classifications at the top of the diagram and using 180 deg. bend test either in the form of the standard cold bend test or the hammer bend test, later described in this report, as a criterion for emphasizing the critical hardening. The solid circles represent surfaces which failed to pass the 180 deg. bend test, those of the lower order of hardness enjoying a considerable degree of ductility nevertheless, while on the other hand, those in the upper hardness range have extremely brittle characteristics.

The figure regards four stages of hardness, the limits of which, though more or less arbitrarily determined, rest upon the findings of many tests and observations. The limits of the upper stages are more approximate than those of the lower.

The low alloy structural grades of steel, with few exceptions, are seen to be in an extremely vulnerable position on the chart, which explains why it has been necessary

NO. 1—

CUT SURFACES IN SOME CARBON AND LOW ALLOY STEELS

OF PARENT METAL		PROPERTIES OF MACHINE GAS-CUT SURFACES				
		PLAIN GAS-CUTS		FLAME-SOFTENED GAS-CUTS		
Bend Test	Hardness in Terms of Standard Brinell	Hardness in Terms of Standard Brinell	Bend Test	Hardness in Terms of Standard Brinell	Anvil Bend Test Deg. of Bend	Temp. Material When Cut
180°	137 (ave. 1/2" below machined edge) 165 (ave. machined surface)	218 (max.)	180° C.B.(2) 170°-180° C.B.(3)			Approx. 70° F.
180° (4)	153 low—170 high 179 (ave. furnace annealed) 241 (ave.)	364 low—375 high 532 (ave.) 585 (ave.)		146 low—179 high (post) 235 (ave.) (I.P.) 241 (ave.) (post)(14)		Approx. 50° F. Bet. 70°-80° F. Approx. 45° F.
34°—43° A.B.	222 low—259 high	583 low—639 high	0—Abrupt	254 low—325 high (post) (14) (15) 304 low—308 high (post) (14) (15) 255 low—280 high (post) (14) (15)	3° 33° 62°	
56% in 1/2" F.B. O.K. C.B. O.K. C.B. 40% in 1/2" F.B. 180° C.B. 180° C.B. 180° C.B.	159 low—168 high 153 low—179 high 149 low—159 high 156 low—174 high 153 (ave.) 159 (ave.) 171 (ave.) 163 (ave.) 175.5 (ave.)	291 low—402 high 202 (ave.) 187 low—192 high 310 low—341 high 192 low—248 high 202 low—248 high 269 low—409 high 238 low—241 high 277 low—522 high	8% in 1/2" F.B. 164° C.B. 180° C.B. 10% in 1/2" F.B. 17° to 38° A.B. 38° C.B. 10° to 15° A.B.	153 low—166 high (pre.) 170 low—179 high (pre.) 156 low—203 high (post) 188 low—212 high (post)	180° 180° 180° 180°	Approx. 70° F. Approx. 70° F. Approx. 70° F. Approx. 70° F. Approx. 70° F.
180° C.B. 180° C.B. 180° C.B.	179 (ave.) 165 low—183 high 166 low—183 high 174 low—223 high	255 (ave.) (5) 302 low—332 high 286 low—418 high 241 low—444 high	0—Abrupt C.B. 0 to 56° C.B. 0 to 25° C.B.	179 (ave.) (pre.) 179 low—228 high (pre.) 199 low—228 high (pre.)	OK—C.B. OK—C.B. OK—C.B.	Approx. 70° F. Approx. 70° F. Approx. 70° F.
180° A.B. 180° A.B. 180° A.B. 38% to 46% F.B. 55° to 70° C.B.	166 low—179 high 156 low—200 high 181 low—196 high 150 low—200 high 174 (ave.)	460 low—555 high 203 low—421 high 344 low—486 high 269 low—444 high 435 low—444 high	0—Abrupt A.B. 42°—132° A.B. 7°—32° A.B. 20°—72° A.B. 8% in 1/2" F.B. 11° to 15° C.B.	179 (ave.) (post) 179 low—245 high (pre.) 166 low—241 high (post) 179 low—285 high (pre.) (Hardness data missing) (pre.)	180° 180° 180° 180° 180°	Approx. 50° F.
	140 (ave. furnace annealed)	469 (ave.)		241 (ave.) (I.P.)	Not subjected	Bet. 70°-80° F.
180° A.B. 180° A.B. 180° A.B.	226 low—240 high 214 low—219 high	430 low—504 high 437 low—486 high 462 low—539 high	9°—20° A.B. 5°—44° A.B.	196 low—237 high (post) 179 (ave.)(9) (post) 195 low—212 high (post)	180° 180° 180°	
	196 (ave. furnace annealed)	455 (ave.)		262 (ave.) (I.P.)		Bet. 70°-80° F.
180° A.B. 180° A.B.	132 low—168 high 134 low—175 high	132 low—203 high 150 low—258 high	180° A.B. 94°-180° A.B.(10)	145 low—200 high (pre.)	180°	

(8) These values quoted from Table 22, "Evolution of High Strength Steels Used in Structural Engineering," by L. S. Moisseiff, Oct., 1936, A.S.C.E. Symposium, "Structural Applications of Steel and Light Weight Alloys."

(9) This figure is unusually low for the grade of steel in question; however, the hardness of flame-softened cuts in this grade is consistently below the hardness of as-rolled condition.

(10) Cor-Ten in gauges 3/4" and 1" will pass 180° AB test satisfactorily if cut at reduced cutting speeds. For fast production cuts, a mild softening treatment is necessary for the same degree of ductility.

(11) From Trans-Bay Bridge heats.

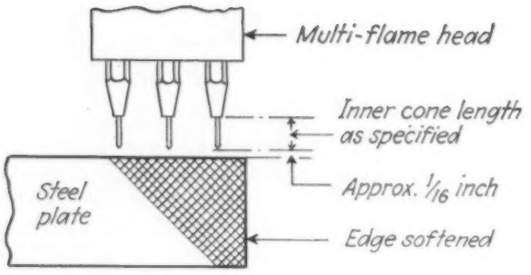
(12) From Golden Gate Bridge heats.

(13) Average properties reported by V. D. Beard in paper: "Actual Applications of Special Structural Steels," presented before A.S.C.E. Symposium, Pittsburgh, Oct. 14-15, 1936, Page 1255, as follows: Carbon 0.31%, Manganese 0.82%, Yield Point 53.9 kips/sq. in., Tens. 89.8 kips/sq. in., elongation in 2"—22.8%.

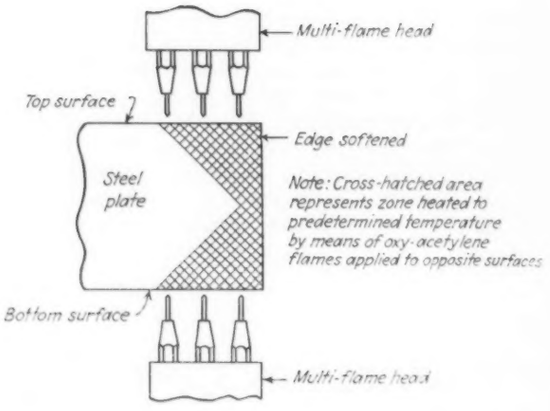
(14) Type II treatment.

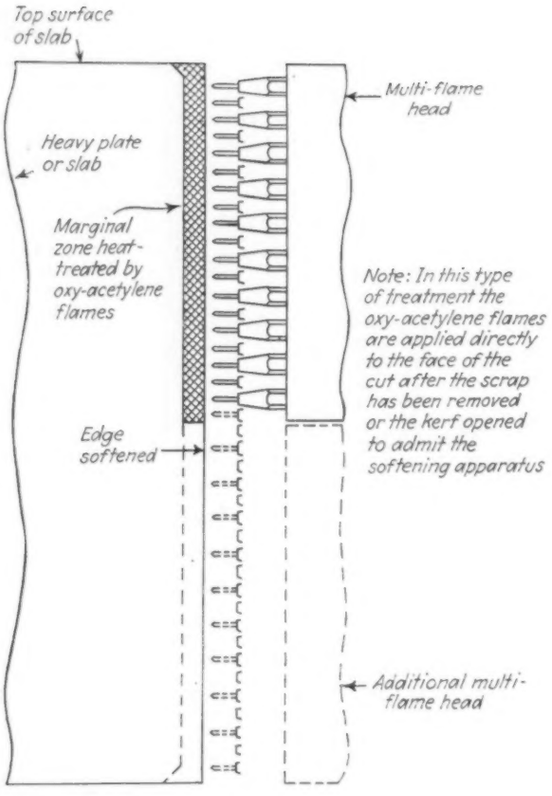
(15) These results were obtained with varying heat treatments.

Note: Due to the shallow depth of the hardened zone under investigation in these tests, hardness readings were made with the Rockwell "C" scale for the hardest surfaces and with the Rockwell "B" scale for flame-softened surfaces. In the field, in some cases, the portable scleroscope was used. All readings have been converted to standard Brinell according to the T. N. Holden Chart (Iron Age, July 10, 1930, Page 80).



Note: Cross-hatch area represents zone heated to predetermined temperature for softening by means of oxy-acetylene flames applied to surface of plate along the edge


Multi-flame head
Top surface
Edge softened
Steel plate
Note: Cross-hatched area represents zone heated to predetermined temperature by means of oxy-acetylene flames applied to opposite surfaces
Bottom surface
Multi-flame head


Top surface of slab
Multi-flame head
Heavy plate or slab
Marginal zone heat-treated by oxy-acetylene flames
Note: In this type of treatment the oxy-acetylene flames are applied directly to the face of the cut after the scrap has been removed or the kerf opened to admit the softening apparatus
Edge softened
Additional multi-flame head

UPPER LEFT

FIG. 2-a—Sketch illustrating the set-up for Type No. 1 flame - softening treatment.

UPPER RIGHT

FIG. 2-b—Sketch illustrating the set-up for Type No. 2 flame - softening treatment.

AT LEFT

FIG. 2-c—Sketch illustrating the set-up for Type No. 3 flame - softening treatment.

for the fabricating shops to machine or grind cut surfaces in these grades in order to prevent subsequent damage to these surfaces either in shop handling, assembly, erection or while in service.

Supplementary Operations Add to Cost

Where the dimensions of the parts permit, resort has been made in some cases to furnace preheating and annealing after cutting to prevent and/or overcome hardening, or, as often done in the steel mills, to sandwich the parts to be cut between hot slabs or ingots to give them sufficient body heat to prevent quenching of the cut edges. Similar remedial practices are employed for the plain high carbon steels and the more prominent high alloy grades which are readily cutable.

These supplementary operations, while effective where they can be applied, add substantial increments of cost to flame cutting operations. There are cases also where due either to the size of the part to be cut or to the contour of the cut, such supplementary operations are not feasible. These conditions influence and often lead to adoption of other means for shaping and preparation, even though more costly and, in some instances, they lead to restrictions in the use of an otherwise desirable steel.

General shape cutting of the hard structural steels is practically out of the question unless large capacity heat treating furnaces are provided, as subsequent machining is usually prohibitive in cost.

Shape Cutting of Hard Steels Studied

A simple and economical solution of this problem was the objective of a development program undertaken by the author's company about the time construction work was getting under way for the Golden Gate and Trans-Bay bridges at San Francisco. This program was stimulated by an adverse report on flame cutting of silicon structural steel obtained from heats providing material for the former structure. This report was submitted by Leon S. Moisseiff, consulting engineer, New York, to the Structural Steel Welding Committee of the former American Bureau of Welding at the latter's 1933 spring meeting. The trouble was investigated and the results led to the conclusion that flame cutting, as ordinarily applied, was not a satisfactory tool for the grade of steel in question, and was so stated to the committee.

Localized heat treating provided a means for overcoming the trouble, and its coordination with cutting effected an economical solution. Means were found to carry out the heat treating operation simultaneously with cutting for

the usual thicknesses of steel employed in general construction work, thus simplifying the operation still further.

Material Cut and Heat Treated Simultaneously

Rapid heat flow with a suitable quantity of heat was necessary for the latter facility, in turn, calling for a steep temperature gradient between the source of heat and the relatively cold plate. The oxy-acetylene flame provided this, and the necessary quantity of heat was obtained by banking numerous flames in suitable blocks which could be manipulated about the cutting zone to effect the desired heat treatments. Simultaneous operation of the heat treatment with cutting from this point required only the adjustment of heat quantity to effect a specific treatment at a specified cutting rate.

As the gage of the metal increases, it becomes more and more difficult and expensive to carry out the simultaneous operation, inasmuch as it must be performed by soaking the heat into the metal from its nominal surfaces due to inaccessibility of the walls of the cut during the cutting operations, which are confined within a narrow slot or kerf before the respective parts are separated. For the heavy gages it was found to be more practical, therefore, to apply the localized heat treatment directly onto the surface of the cut after the parts were separated. This operation is likewise performed progressively for long cuts.

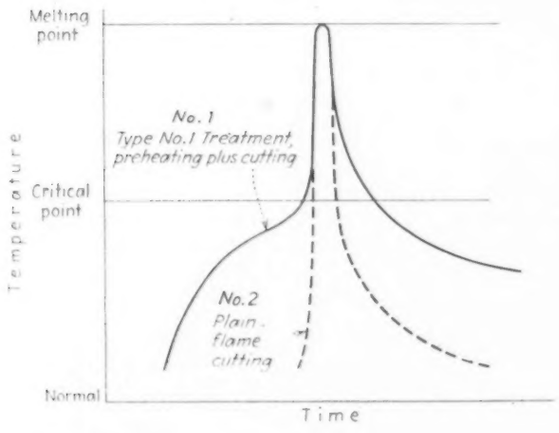
Several Methods of "Flame-Softening"

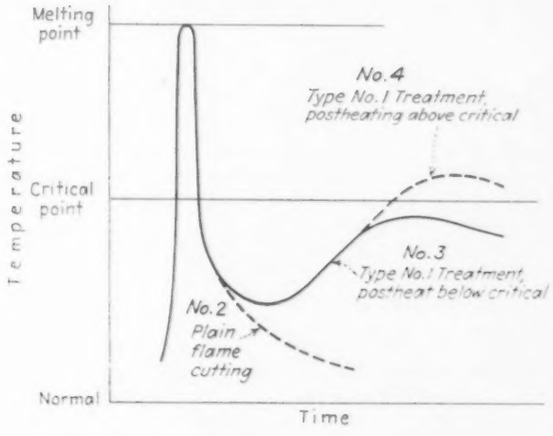
The several methods for applying the heat treatment, or "flame-softening," as the process has recently been termed, for all thicknesses, are shown diagrammatically in Fig. 2.

Type No. I treatment, shown by Fig. 2-a, has been applied successfully to plate thicknesses up to and including 1½-in. where it is desired to meet the requirements for bending laid down by standard specifications. For a lower degree of softening than required by these specifications, the thickness range for Type I treatment may be extended to 2 in., or even to 3 in.

Type No. II treatment, Fig. 2-b, extends the principle of Type No. I treatment to approach 4-in., depending upon the grade of steel. However, due to mechanical difficulties in under-reaching a plate, this treatment is more or less confined to edge cutting or where the cut can be conveniently reached by relatively short extension arms from along the edge of the material. This type of treatment was found advantageous in making guard rails from standard railroad rails where it was necessary to reduce the width of one flange of the rail. The under flames in this case operated to offset the additional chill induced into the flange by the web of the rail, enabling the treatment to proceed at a faster rate than would otherwise have been practicable for the No. 1 treatment.

Type No. III treatment, Fig. 2-c, comes into play for the heavy





ABOVE

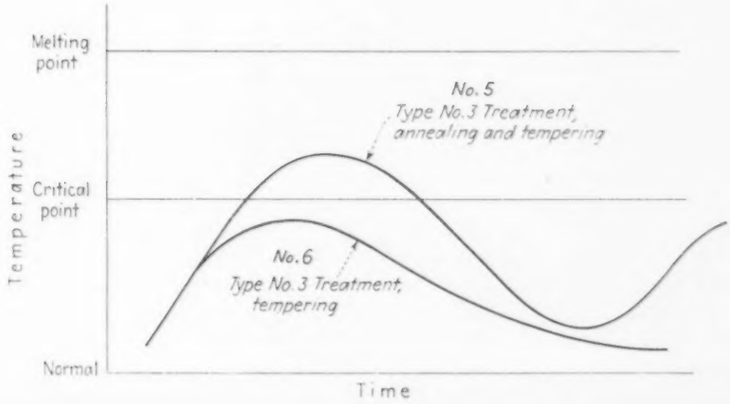
FIG. 3—Time-temperature curve for simultaneous preheating.

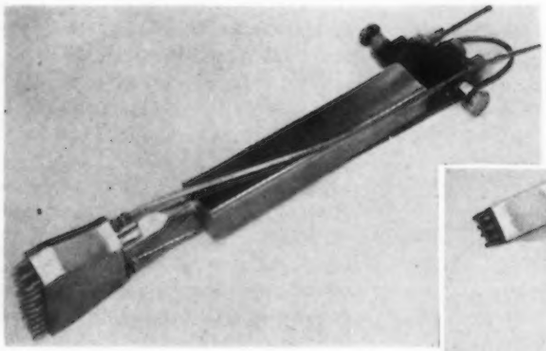
UPPER RIGHT

FIG. 4—Time-temperature curve for simultaneous post heating

AT RIGHT

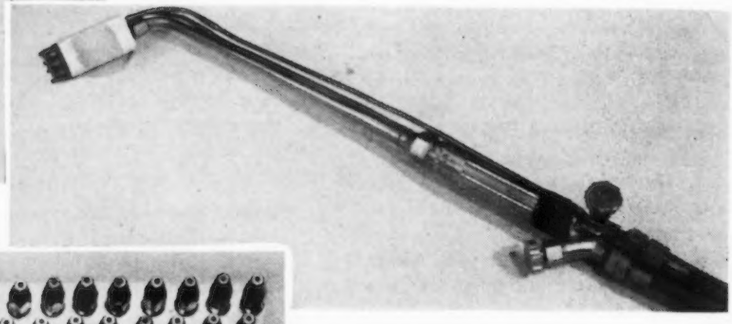
FIG. 5—Time-temperature curve for Type No. 3 flame-softening treatment.

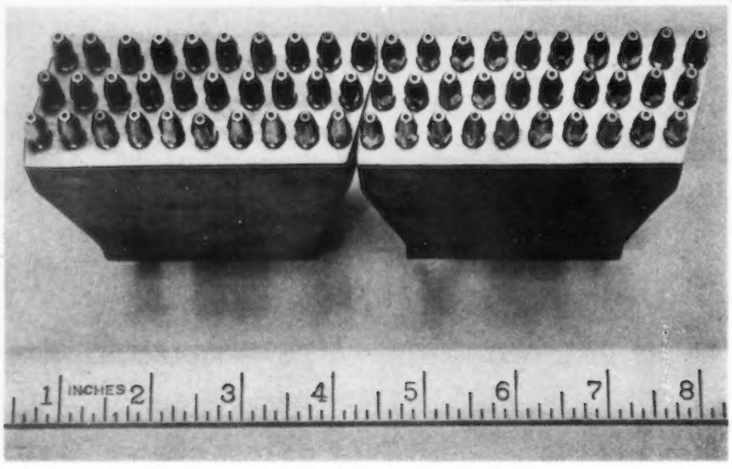




AT LEFT

FIG. 7—Flame-softening blowpipe with 30-flame head.





ABOVE

FIG. 6—Assembly of hand-operated flame-softening blowpipe with 7-flame head.

o o o

AT LEFT

FIG. 8—Tandem group of two 30-flame heads.

gages. Preferably it should be applied before the cut surfaces cool to room temperature, particularly in the case of those grades which are extremely sensitive, in order to prevent microscopic and/or visible surface checking or definite cracking.

Applied to Both Quench and Air Hardening Steels

Within the scope of heat treating carried out as above described, the grades of steel softened to date may be arranged into two groups:

The first includes those that harden only when rapidly quenched from temperatures above the critical point, which classify under flame-softening terminology as "quench hardening steels." This group includes the plain carbon steels of medium carbon content, the structural steels of low carbon and low manganese content and some of the newer corrosion-resisting low alloy steels before mentioned.

The second group, which classifies as "air hardening steels," includes those which harden when slowly cooled in shop atmospheres from temperatures above the critical point, such as the low alloy high strength structural steels.

The approximate characteristics of the several flame-softening treatments from the time-temperature standpoint are show graphically in Figs. 3, 4 and 5.

Fig. 3 indicates the approximate slope of the time-temperature curve for preheating to a visible red color in shop daylight simultaneously with cutting. It is seen that the effect of preheating has been to raise the temperature of the steel at the moment of cutting to a point just below the Ac_1 point. If desired, the preheated portion of the curve may be carried above this point for quench hardening steels; it is seldom desirable or necessary, however, to do this.

The contrast of curve No. 1 to that of curve No. 2 of Fig. 3 is one giving longer time for the parent metal to cool, which in turn allows more time for the development of soft structures. Here, flame-softening prevents hardening by preventing a rapid quench following cutting, and is applicable to the so-called quench hardening grades.

Time-Temperature Curve for Post-Heating

Fig. 4 indicates the approximate slope of the time-temperature curve for post-heating to a visible red color following cutting. This, like the application shown in Fig. 3, is a type No. I treatment. Where post-heating is employed the heat generated by the cutting operation elevates the temperature of the metal in the cut surface to the melting point, whereupon it drops rapidly, passing through the Ac_1 temperature at a rapid rate to a point well below it, where it is again elevated by the post-heating to a predetermined red heat, from which point it is allowed to cool to normal temperatures.

For air hardening grades requiring this type of heat treat-

ment, such as the nickel and silicon and manganese structural steels, it is essential that the post-heat does not exceed the critical point. The heat treatment effected by curve No. 3 allows the hard constituents to form, whereupon they are tempered or softened by the subsequent heating operation. The treatment depicted by curve No. 3 is also effective for softening the quench hardening grades, in which case the post-heating may be carried to above the critical point of the steel, if desired, in order to increase the rate of heating. However, if not carefully performed, this leads to the danger of surface melting.

Cutting and Heat Treatment Carried on Separately

Fig. 5 indicates types of time-temperature curves that come into play with type No. III treatment, where the cutting and heat treatments are carried on as separate operations because of the necessity of either dropping the scrap or opening the kerf at the completion of cutting to provide room for the admission of the flame-softening apparatus.

For tempering the constituents in the cut surface curve No. 6 applies, and is similar in its effect to that of curve No. 3 of Fig. 4. If applied immediately after cutting when the cut surface is still hot, which is desirable from several angles, the heat input is consequently less. For steels which are more highly resistant to tempering, such as some of the low alloy chrome-nickel and chrome-molybdenum steels, the time-temperature conditions for effective tempering are so close to the critical point that it is more expedient to use a different type of treatment than that shown in curve No. 6. An anneal, followed by a sub-critical, in such manner as to increase the time element of tempering, has been found effective in producing substantial reductions in the hardness of plain gas-cut surfaces. Curve No. 5 approximates the time-temperature conditions for a treatment of this character.

For the majority of steels sensitive to the quenching action following gas cutting, a softening treatment, indicated by curve No. 3 of Fig. 4 for the lower gages, and curve No. 6 of Fig. 5 for the heavy gages, which employ post-heating, serve for both air and quench hardening grades and, therefore, require a common set-up of the heat treating apparatus.

In the foregoing diagrams, the critical point is the Ac_1 point in all cases.

Commercial Apparatus Developed

The commercial apparatus developed to perform these treatments is shown in Figs. 6 to 10, inclusive. The several units are assembled from standard equipment with the exception of the special brackets or arms for multiple blowpipe mountings which, when needed, are best worked out at the place of application.

Certain aspects of the processes of flame softening described in this paper are covered by patents and patents pending; however, the processes, as presented, are to be made available to the fabricating industry through license agreements.

Flame-softening heat is provided by either seven-flame or 30-flame water-cooled heads, and these are connected by straight or angular fittings to blowpipes providing adequate volumes of mixed gases.

For straight-line mechanical applications for usual fabricating shop purposes, a variable-speed,

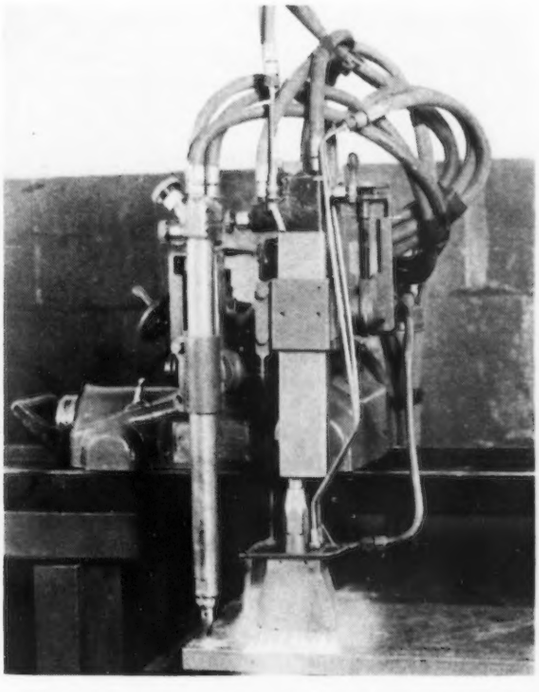


FIG. 9—Standard apparatus for Type No. I flame-softening treatment using a 30-flame head.

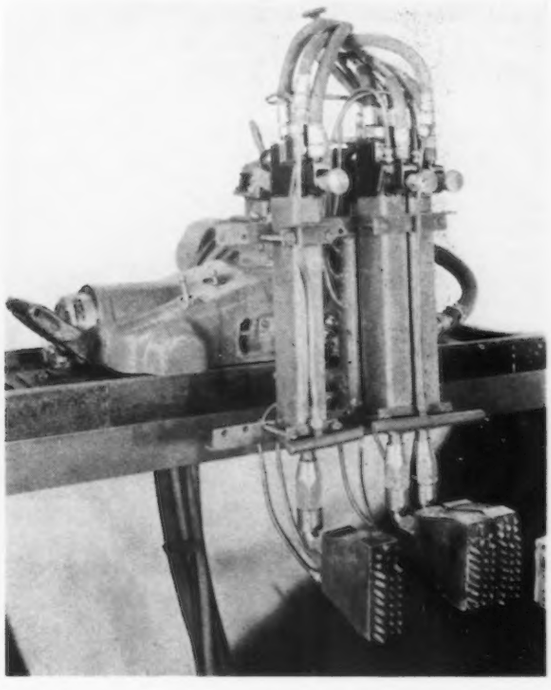


FIG. 10—Standard apparatus to provide a flame-softening treatment depicted by Curve No. 5 in Fig. 5.

portable propelling unit is employed to move the apparatus over the work. For simultaneous operations of cutting and softening, the flame softening equipment is merely added to standard mechanical cutting units by means of auxiliary brackets or fixtures. Various combinations of flame assemblies and heat area dimensions can be obtained by grouping the seven-flame and/or 30-flame heads, and by the further expedient of blanking out one or more tips with plugs. When it is desired to soften one side or face of a cut or kerf by post-heating, one 30-flame head usually suffices where the thickness of the metal does not exceed 1½ to 2 in. If the cut is through the body of the plate and it is desired to soften both sides or faces of the cut, two 30-flame heads should be used, one operating on either side of the kerf.

For Type III treatment in heavy slabs, economy may be obtained by banking two or more heads abreast. For small cuts and those inaccessible to mechanical equipment, the seven-flame hand blowpipe has been found most useful.

Fig. 6 is an assembly of the hand-type blowpipe complete with service connections for oxygen, acetylene and water. Fig. 7 pictures an assembly of a 30-flame water-cooled rhomboid head with appropriate water-cooled blowpipe with cooling water tubing, and Fig. 8 a tandem group of two 30-flame rhomboid heads, illustrating a means for increasing the length of the flame softening heat area.

Readily Changeable From Pre-heating to Post-Heating

Fig. 9 is a front view of standard apparatus for simultaneous Type I treatment using a single bank of 30-flames shown in the operation of cutting and flame softening a 1-in. low alloy plate. The apparatus in this case is preheating, but could readily be changed to post-heating by reversing the direction of travel and moving the 30-flame head sideways so as to direct the flames upon that side of the cut having the surface to be softened.

Fig. 10 shows a special assembly of standard apparatus to provide a flame softening treatment similar to that depicted by curve No. 5 of Fig. 5. As the steel being treated is less in thickness than the full width of the 30-flame heads, seven of the upper tips have been plugged to keep the flames within the bounds of the surfaces being treated. The first bank of heads heats the surfaces of the steel to an annealing temperature, the intervening space allowing this temperature to drop to a suitable black heat, whereupon the second bank of flames re-heats the surface to a temperature under the critical point, thus effecting a temper or draw from below this point.

The degree of softening produced by flame softening processes in the grades of steel listed in Table 1 is also shown in that table under "Properties of Machine Gas-Cut Surfaces," and again in Fig. 1 under the heading, "Flame Softened." It is seen that either by preheating or post-heating with Types I, II and III treatments, hardness has been prevented or kept within reasonable limits. For the structural grades in both the quench hardening and air hardening groups, the residual ductility in the cut surfaces, after softening, when cooled to normal temperatures, is of the same order as that of the parent metal, having withstood either the standard cold bend test or the hammer bend test without cracking. In some cases, the residual hardness is slightly lower than that of the rolled material.

In the case of the critical high carbon steels in group "A" and the steels in groups "D" and "F" which were treated non-simultaneously by the Type III treatment, the hardness of the cut surfaces has been reduced nearly 50 per cent by a single high-speed tempering pass, or to a degree such as to be readily machinable or to overcome the possibility of cracking during cooling. Modification of this treatment should lower the hardness still further.

Bendability Determined by Anvil Bend Test

Bendability of the unsoftened and softened surfaces was determined in most cases by a hammer bend test or, as later termed, an "anvil bend test," which subjected the surface to bending in combination with shock.

The diameter of the nose of the anvil was made equal to twice the thickness of the specimens which, in turn, were made ½-in. in all cases for purposes of expediency in determining the relative ductility of the various specimens. The force of the blow applied to effect this test was appreciable, being that developed by the full arm swing of a 6 to 8-lb. sledge hammer. The blows were applied at the extreme outer end of the specimen so as to resolve the force into definite bending and shear stress. The measure of ductility for the surface under test was the angle of the arc attained by the specimen in bending around the anvil at the moment of rupture of the remote fibers at the crown of the bend.

It is this angle which is quoted in the several bend test tabulations in the body of this report where designated as "anvil bends."

More Drastic Than Pin Bend Test

While this test is somewhat at variance with standard pin bend tests, both as to manner of testing and ratio of pin diameter and thickness of specimen, it is regarded as a more drastic test of metal surfaces, particularly of the marginally affected zones under the cut surfaces, than the slowly applied standard pin bend tests.

The factor of impact introduced in the anvil bend test subject the metal under investigation to shock, in combination with an appreciable amount of flexural stresses, a condition often encountered in commerce, particularly in some bridges, railroad vehicles and numerous pieces of industrial equipment.

The amount which a specimen bends depends to a large extent upon the character of its outer surfaces. If smooth and regular, such as obtained by machine gas cutting, full bends can be attained at higher hardnesses than where the surfaces are irregular in contour. The anvil bend test is particularly valuable in evaluating the utility of various grades of cutting workmanship.

The point of workmanship of cutting is important, and observations point to smooth cutting for most economical and reliable results.

(To be Continued)

Modernization at Wisconsin Steel

o o o

By ROBERT G. BINGHAM
Western Editor, THE IRON AGE

o o o

o o o

The Wisconsin Steel Works came into the hands of the International Harvester Co. in 1902 when that company was organized. At that time the works consisted of a rolling mill, a cut nail mill, and one old blast furnace.

Since then the plant has been enlarged from 55 to 202 acres, finished steel capacity has increased from 108,000 tons in 1903 to 564,000 tons, pig iron production has been stepped up from 200,000 tons to 643,000 tons, while open hearth capacity is now 600,000 tons annually. The plant now includes 132 coke ovens, three 600-ton blast furnaces, a modern pig-casting machine, nine 100-ton basic open hearth furnaces, a 21-in. billet mill, four merchant bar mills, one cold drawn mill, and a new blooming mill. In addition the company owns two ore freighters.

Over the last 18 months about $6,000,000 has been spent for modernization of this plant, most of which was devoted to the building of the blooming mill mentioned above, the balance representing the construction of a 21-in. continuous billet mill, and the rehabilitation of one of the merchant mills.

The extension of the blooming mill department at this time was planned some years ago when a 40-in. reversing blooming mill was constructed, forming the first unit in the now completed department. This mill was housed in a building 325 ft. long with a 90 ft. span, while at right angles to this and at one end, was located the soaking pit building which is 425 ft. long with a 75-ft. span. Directly outside the pit building is the stripper building containing two overhead stripper cranes for big-end-down molds and a hydraulic ram-type stripper for big-end-up molds.

Soaking Pits

The pit building is equipped with two charger cranes. In this building is a row of six four-hole pit furnaces, each hole being 9 by 6 ft. taking an 85-in.-high ingot. These pits, of the regenerative type, are now heated by mixed coke oven and blast furnace gas, automatic regulation of the mixture and automatic maintenance of pressures being obtained by the use of a modern-type gas regulator. Prior to using mixed gas for heating, these pits were heated with gas from five gas producers located in an adjacent building. A reversal on these pits is obtained by a rotating-type valve installation.

The ingots are delivered from the pits to the table rolls by means of an ingot buggy controlled from a pulpit in line with the mill table rolls. The 40-in. blooming mill is a two-high reversing mill driven by a 7000 hp. d.c. motor with a speed variation from 50 to 120 r.p.m. This motor is driven by a 3-unit M.G. set consisting of two 3000-kw. generators and one 4000 hp. wound rotor induction motor, which takes 2300 volts.

The bar is handled in the mill by an electrically driven manipulator with an overhead finger lift mechanism. The rolls for this mill are 92 in. long having a bullhead pass and other passes of 12, 8, 6, 3, 5 and 4 in. The products rolled here prior to the completion of the new units, were billets from 4 x 3 in. to 8 x 8 in. and slab billets and slabs from 5 x 30 in. in width. At that time, the product on leaving the mill was transferred on a 145-ft. rail and cable transfer to the shear approach table and sheared by an electrically driven shear of 160-sq. in. capacity.

Following the shear was a movable depressing table. As the table moved back, the crops were dropped into a chute and discharged on a conventional-type chain conveyor. The conveyor carried the crops to pans which were immersed in a quenching tank and thence to cars. Inasmuch as the

products of this mill were cut into lengths averaging 12 ft. when they left the shear, they were removed by a grasshopper-type kick-off to a billet conveyor and into stake cars.

The average rolling capacity of the mill at that time was about 40,000 tons a month, some additional tonnage being rolled on the old steam-driven, 35-in. blooming mill that was built in 1903, and is now abandoned because of the construction of the newer units.

New Bloomer and Continuous Mill

In order to provide more suitable billets for existing finishing mills, the construction of an additional reversing bloomer and a continuous mill was begun. These units are housed in a 475-ft. addition to the main mill building, which now measures 800 ft. overall, with a cooling bed building 200 x 73 ft. alongside. The addition to the main mill building is of standard conventional design with the exception of sloping skylights that are provided in the monitor.

This extension was completed and put into operation in September, 1937, the former capacity being about doubled.

Housed in the 800-ft. main mill building is the 40-in. bloomer, a bloom crop shear, the 32-in. bloomer, a billet and slab shear, two transfers, a 6-stand 21-in. continuous mill followed by a flying shear, finishing end tables, shear, and cooling beds.

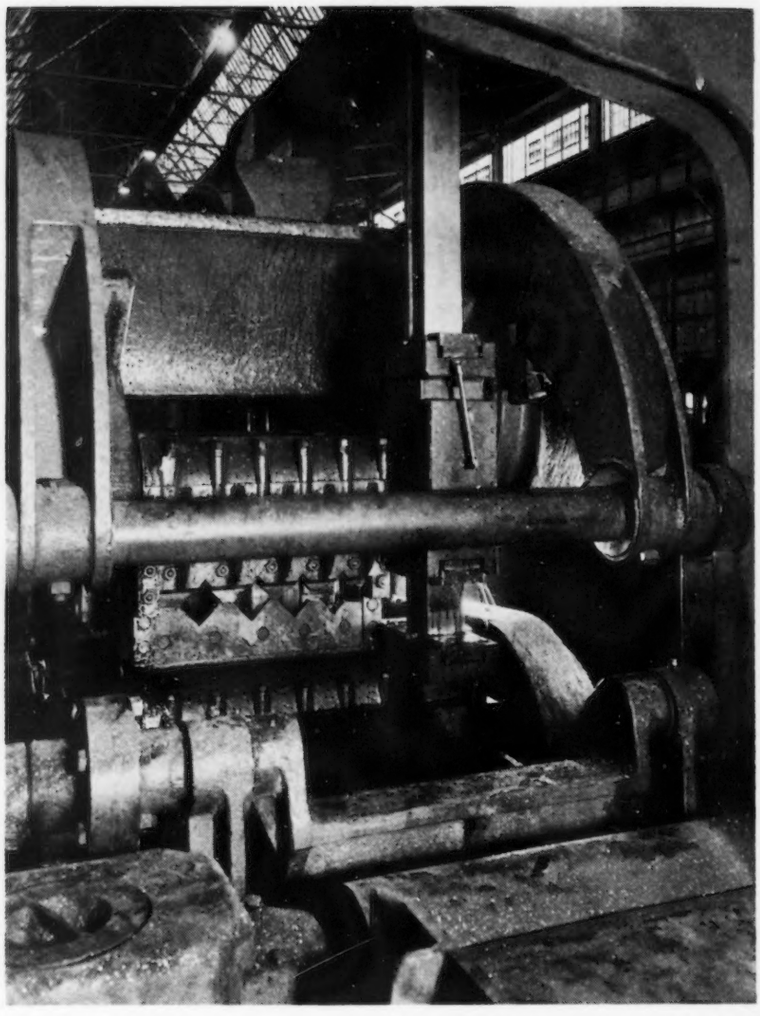
Following the 40-in. bloomer delivery tables is a 58-ft. one-way cable transfer, and in line with the mill is a new United up-and-down-cut crop shear driven by a 150-hp. a.c. motor. This shear has a capacity of 180 sq. in. and is equipped throughout with roller bearings and has an individual lubrication system. The blooms that come from the 40-in. mill are cropped of pipe on this shear and then are transferred on the 58-ft. transfer to the 32-in. mill approach tables. The crops drop directly into a chute, into the skip buggy, from where they are dumped into cars. The 32-in. mill tables are provided with roller bearings and are automatically lubricated by a modern grease pressure system.

Two-High Reversing Unit

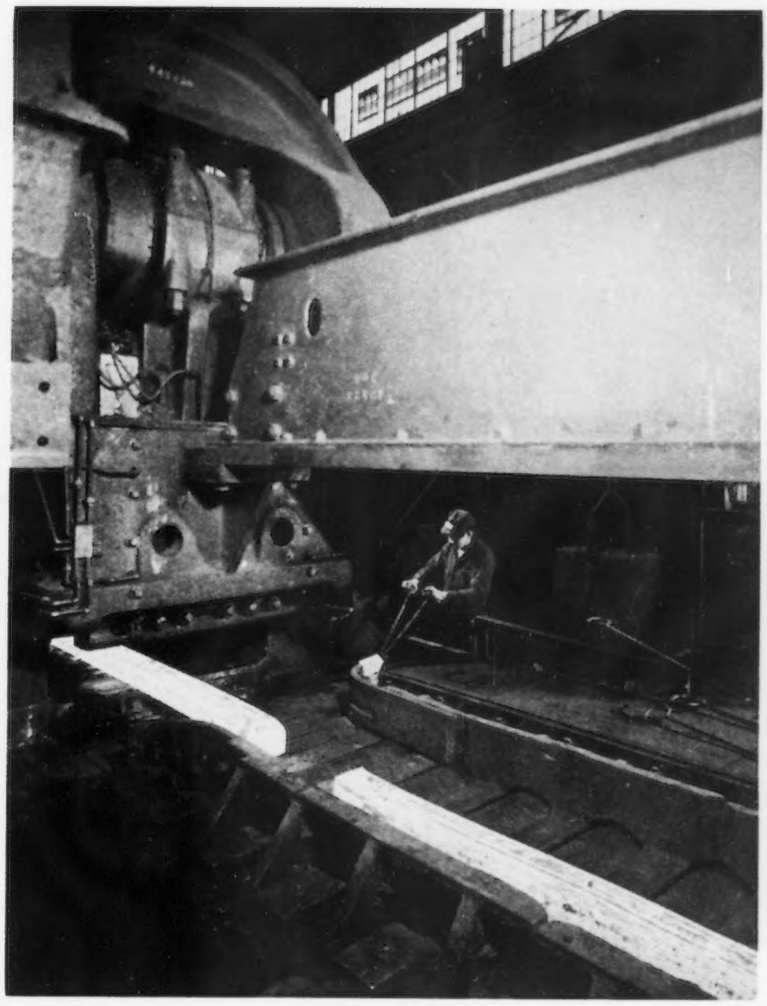
The 32-in. mill is a two-high reversing unit connected by means of gears and pinions with a 4000 hp. d.c. motor. This motor is driven by a 3-unit, M.G. set consisting of two 2000-kw. generators and one 3000 hp. wound rotor induction motor, taking 6600 volts.

By means of the manipulator at this mill it is possible to turn the bar on either side of the mill since heads are located on both sides. The speed on this mill may vary from 75 to 165 r.p.m. The mill takes a 72-in. roll, having a bull-head pass, and other passes of 8, 6, 3, 5, and 4 in. Billets from 4 x 3 in. to 8 x 8 in. may be rolled as can slab billets and slabs from 5 x 24 in. wide.

The screws are worm driven, and the mill is equipped with a phenolic resin-type bearing, the screws being lubricated separately. The pinion stand has an individual lubricating system with a tank and a small electrically driven pump.



CLOSEUP, front view of rotary flying shear, operated in connection with 21 in. continuous mill.



SHEARING billets that have been finished in the 32 in. blooming mill. Crop transfer table is shown between shear and shear table.

Lubrication of the mill roller bearings and the manipulator roller bearings is taken care of by the main grease system.

From the 32-in. mill the bar is delivered to a 150-ft. two-way cable transfer, where it is transferred to the delivery tables of a down-cut shear that is in line with the crop shear and 40 in. mill unit. The two transfers are connected by means of a table so that wide slabs and blooms may be rolled on the 40-in. mill and sent through the crop shear to the down-cut shear and then delivered to cars.

o o o

AT LEFT

INGOT in manipulator at 40-in. blooming mill rolls, with finished blooms in background.

Down-Cut Shear

The down-cut shear, driven by a 200 hp. a.c. motor, has a capacity of 180 sq. in. This shear is provided with a hydraulic hold-down ram, individually driven crop pusher, and a 30-ft. electrically operated screw gage. A crop delivery unit attached to the end of the depressing table immediately following the shear has been provided, which is built on the endless-chain principle and delivers crops from this shear sideways to a chute, from the chute to a skip buggy, and from the skip buggy directly into cars.

The table following the shear is equipped with a disappearing stop. Billets sheared to lengths of 15 ft. or less are stopped at this point, and an overhead, electrically driven push-off discharges the billets onto a billet conveyor and thence into stake cars. Following the disappearing stop and push-off is a run-out table provided with a hot-saw, where it is possible to hot-saw billets as long as 30 ft.

These billets may be kicked off by an endless chain kick-off into a 30-ft. cradle just beyond the hot-saw. They then are transferred from the cradle to a covered billet yard adjacent to the mill building by means of a billet transfer car where the billets are slow-cooled, should that be required, or where they may be loaded into standard-gage cars.

The 150-ft. transfer is double, and it is possible, therefore, to roll blooms for the 21-in. continuous mill which is in line with the 32-in. mill on either the 40 or 32-in. mills, thus providing greater flexibility.

The 21-in. Mill

The 21-in. mill consists of six roll stands and two edger stands. These stands are placed as far apart as available room would permit, the distances between the stands ranging from 12 to 18 ft.

Roll speeds on the No. 1 Stand, are from 18 to 36 r.p.m. and increase with each successive stand until speeds of from 70 to 140 r.p.m. are attained at the last stand.

Housings have been provided for both billets and wide flats, the billet stands being of very rigid construction which will take a roll

with a 32-in. body. Roller twist guides have been installed throughout the billet mill, and each stand is separately driven, permitting independent control and regulation of speed of each. The first two stands are each driven by 1500 hp. d.c. motors and the remaining four stands by four 2000 hp. motors.

These motors are driven by a 3-unit, M.G. set consisting of two 3500-kw. generators and one 9370 hp. synchronous motor, which takes 6600 volts. The stands for both billets and bars have been equipped with phenolic resin-type bearings.

top of the stand. The rolls of this mill are short, having only a 24-in. roll body, and the mill is designed to deliver a product 3/16 in. in thickness and 18 in. wide. Looping between the stands is taken care of by automatic adjusting roller loopers.

The six stands of this continuous mill are individually connected through the conventional-type spindle, modern and individually lubricated herringbone-type pinions and gear reduction sets to the motors. The continuous mill is preceded by an individually driven swing crop

DOWN-AND-UP-CUT shear cropping blooms from the 40-in. blooming mill.

The billet mill will produce billets from 1¾ to 4 in. and is so ruggedly designed as to make it possible to roll wide bars. Edging mill stands are placed in front of No. 1 roll stand and between No. 2 and No. 3 drill stands. In rolling some of the smaller-sized billets, No. 1 edger is used to enter the bloom in No. 1 stand on the diagonal.

Continuous Wide Bar Mill

The wide-bar mill stands are of extremely sturdy design without caps or bottom adjusting screws. The top roll is held against the screws by a spring hanger arrangement, and adjustment is obtained by means of a worm mechanism on

shear and is followed by an electrically driven, rotary-type flying shear, designed to give a square cut on billets up to and including 4 in. varying in length from 12 to 36 ft. This shear is driven by two 100-hp. d.c. motors, is synchronized electrically with the finishing stand, and is controlled from the pulpit directly above it.

The run-out tables from the flying shear have variable speeds in order that they may be controlled and synchronized with the speed of the shear itself. These run-out tables deliver the billets to a skew table just preceding two 30-ft. cooling beds which are 60 ft. long and extend from the main mill building into the cooling bed building. Between the beds an up-and-down-cut billet shear, quite similar to the crop shear, has been provided in order to cut lengths shorter than 12 ft. This shear is driven by a 150-hp. a.c. motor and has a capacity of 80 sq. in.

It is possible to deliver a bar from the cooling bed tables directly into a pinch roll and bar piler. The bars are taken from the bar piler with a remote-control, 15-ton, 37-ft.-span crane to the cooling bed in the cooling bed building.

All newly installed tables are provided with roller bearings and are equipped with oil-filtering and grease-lubricating systems.

In the extension to the main mill building is a 15-ton, high-speed crane, having roller bearings and individual lubricating system. The cooling bed building is also provided with a 15-ton crane running parallel to the cranes in the main mill building.

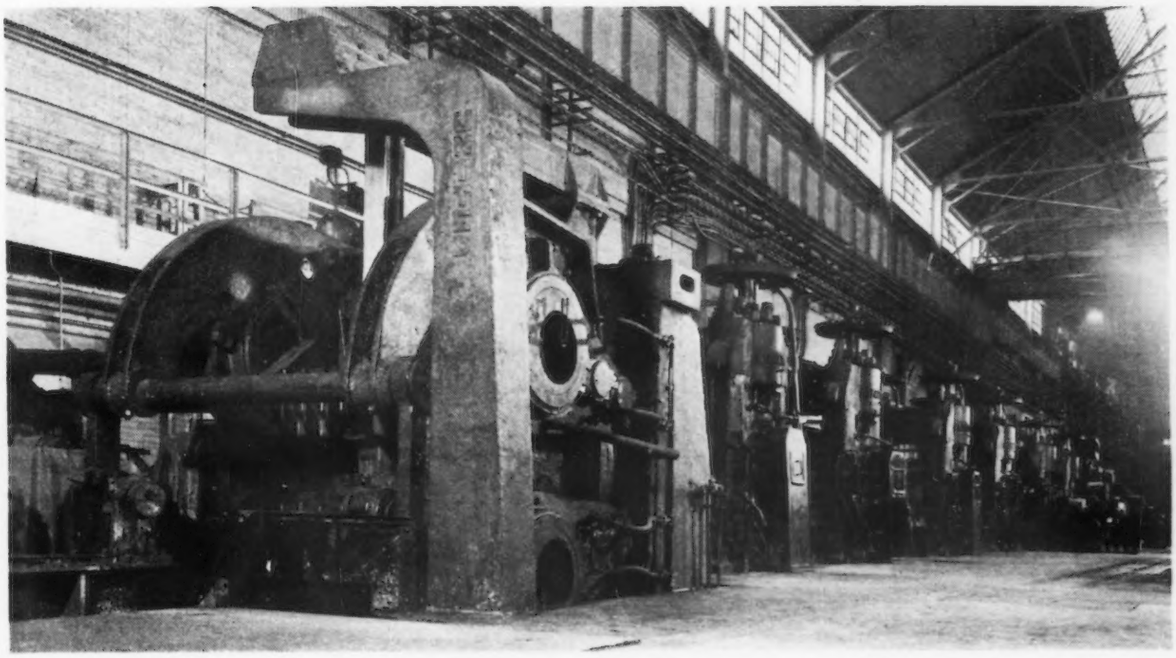
Pressure for Descaling

Provision has been made for descaling by the installation of a 1000 lb. pressure system, which is also used to wash scale under the 32-in. mill and the 21-in. continuous mill. The scale system consists of two 1500 G.P.M. 500-lb. pressure pumps running in series making 1000-lb. pressure for descaling and 500-lb. pressure for washing scale.

The motors of the continuous mill and 32-in. bloomer are housed in separate motor rooms of modern design with air-cleaning equipment. These motor rooms are both serviced by a 60-ton crane on a continuous runway connecting the two motor rooms. Between these two motor rooms is a scale pit for the newly constructed units. The 60-ton crane has an auxiliary 10-ton hoist which is used for loading scale from scale pit.

The construction of the addition also included some relocation and additions to the roll shop of this mill to take care of additional lathe equipment for turning rolls for the new units.

The telautograph system, in use for some years, was extended throughout the newer part of the mill, making possible instantaneous communication between the clerks at finishing end of the mill



FLOOR view of 21-in. continuous mill and rotary flying shear.

and the rollers and steel chargers.

Upon the completion of these new units a greater range of products has been made possible. Blooms up to 12 x 12 in. and slabs up to 30 in. in width may be rolled and sheared in the new set-up, while billets up to 30 ft. in length may be rolled and hot-sawed.

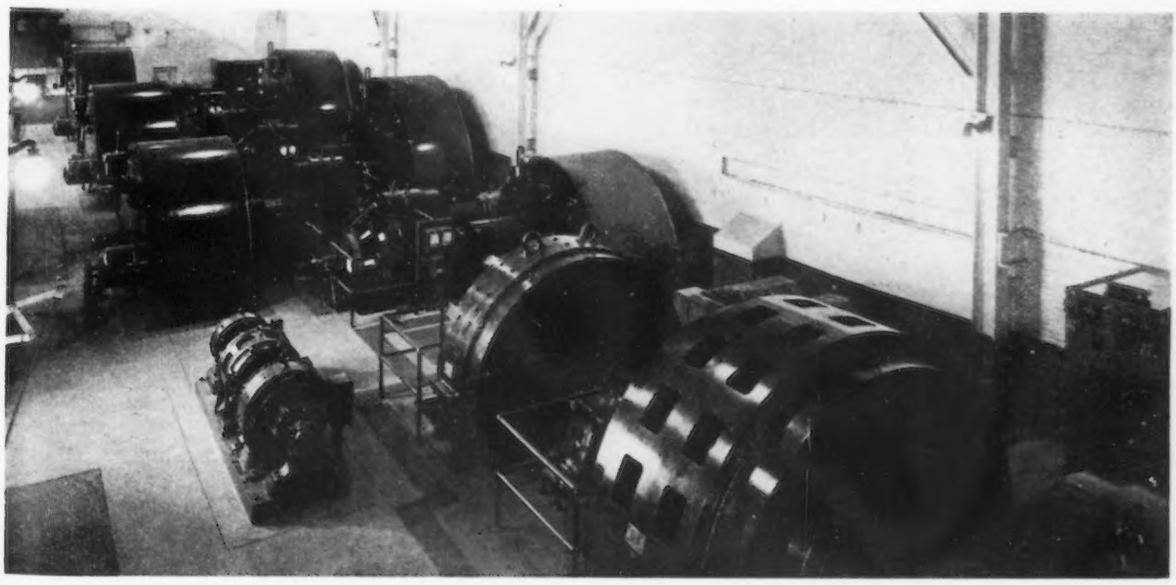
The 21-in. continuous mill makes possible the rolling of billets from 1¾ to 3 in. sq., in varying lengths up to 30 ft. It is possible to roll on this mill flats from 3/16 to 1½ in. thick and up to 24 in. in width. This diversification in size of billets has permitted the rolling of more suitable billets for the existing merchant mills in order that they may meet the exacting requirements of the trade in merchant mill products.

The capacity of this new mill is estimated at 800 tons an 8-hr. day. When additional demands are made of this finishing equipment, it is likely that some increase in ingot capacity will be made, according to George E. Rose, vice-president, International Harvester Co., in charge of Wisconsin Steel Works.

Usually, approximately half the output of this company is consumed by the parent organization, but recently this proportion has increased until probably 60 per cent or more is going to the Harvester Co.

o o o

Motor room for the 21-in. continuous mill.



Odd Jobs Handled Economically

CHAPTER 23 of a Series on Materials Handling Methods and Equipment

o o o

WHEN the operations of mechanical materials handling methods and equipment are viewed from the basic standpoint of the functions of the methods and the types of equipment available to perform those functions, it is found that the functions boil down to two, and the types of equipment to three. To serve all the various operations of *lifting* and *shifting*, both in their simple forms and in their more usual combinations, there are but these three fundamental types of equipment; hoists and cranes, conveyors, and mobile trucks. No matter how complicated the method and complex the equipment may actually be; no matter how scrambled the various elements of any piece of mechanical handling equipment may appear to be as it is installed in or around the industrial plant, analysis brings to light only these two basic functions and these three classifications of apparatus.

Shifting, or the transfer of loads from point to point in a horizontal plane, is accomplished by a conveyor system along a fixed line or series of fixed lines, and thus includes inherent limitations of lateral movement; shifting by means of mobile trucks avoids these limitations of lateral movement, but is limited to the availability of clear aisle space in the plant for truck movements; hoist and crane systems take shifting off the floor and out of the limitations of fixed conveyor lines, but have limitations of their own, depending on the effective area of swing of a boom, or the travel of the crane trolley and bridge. Shifting is the primary function of both the conveyor and the mobile truck systems. It is generally accepted that these systems have their greatest economic applications under circumstances where the loading may be accomplished either by gravity, or where such lifting as may be required to get loads on either system, is relatively slight in amount.

Where relatively high lifts are required to get loads into a position for the required transfer from point to point, the hoist and crane system generally works best. From this it follows that, contrary to the principles involved in conveyor and mobile truck handling, the primary function of hoist and crane systems is *lifting*, with the shifting function relegated to second place. Hoists and cranes are probably made in a wider variety of types and sizes than any other form of mechanical handling equipment. Historically the oldest (for the means of lifting loads antedated the discovery of the wheel), today hoisting mechanisms are by far the most widely used of any form of mechanical handling apparatus. As might be expected, therefore, the variety of handling operations accomplished by hoisting mechanisms, with and without an accompanying crane mechanism to provide the secondary shifting function, is practically without limit.

It is not the purpose of this paper to examine in detail all the various types of application of hoisting mechanisms, but rather to illustrate and describe a few of the odd jobs which indicate the immense range of out-of-the-ordinary applications, with the thought in mind that these applications are, quite evidently, more economically served thus than by any other class of mechanical handling equipment.

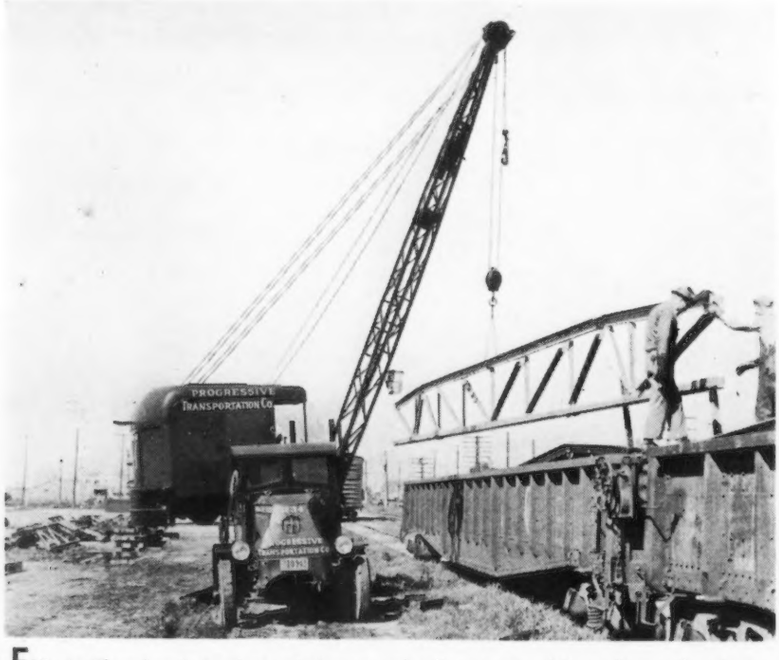


FIG. 1—Thew-Lorain truck-mounted crane unloading structural forms from railroad cars.

Car Loading and Unloading

The loading and unloading of the gondola-type railroad freight car presents typical problems, in that

By Hoists and Cranes

By FRANCIS JURASCHEK
Consulting Editor, THE IRON AGE

in shifting goods into and out of such a car it is necessary to lift them to clear the obstruction formed by the car side. This thought is shown clearly in Fig. 1, where structural material is being unloaded at a railroad siding adjacent to the oil fields in Southern California. A Thew-Lorain crane, mounted on an automobile truck chassis, is readily maneuvered into position alongside the railroad car, the crane-boom extended so that the hoist can pick the girder directly up out of the car with a straight lifting movement, and make it possible to transfer the girder to the ground

FIG. 2 — Whiting Corp. 10-ton gantry crane handling L.C.L. containers in railroad yard.

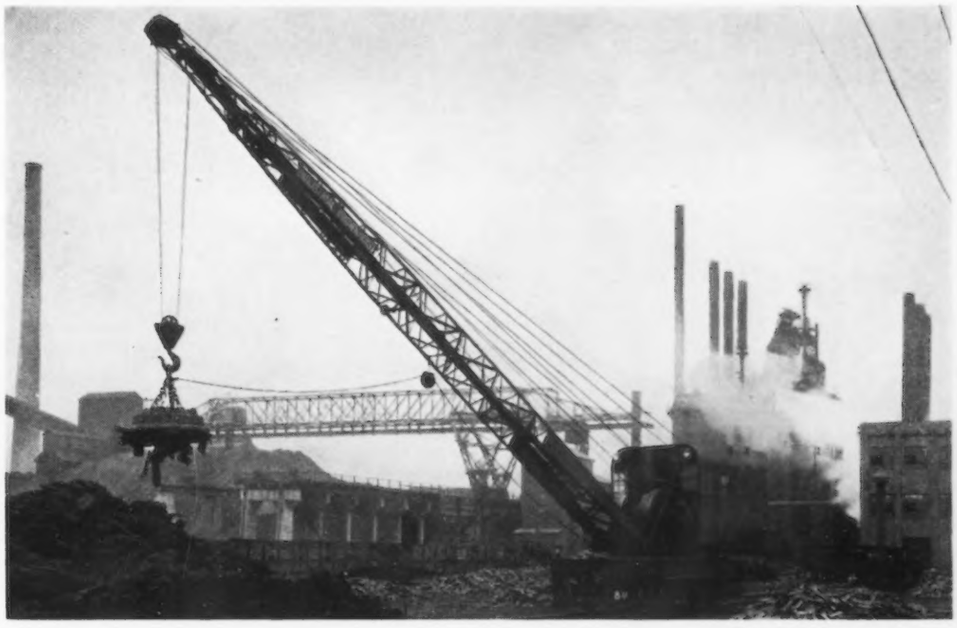
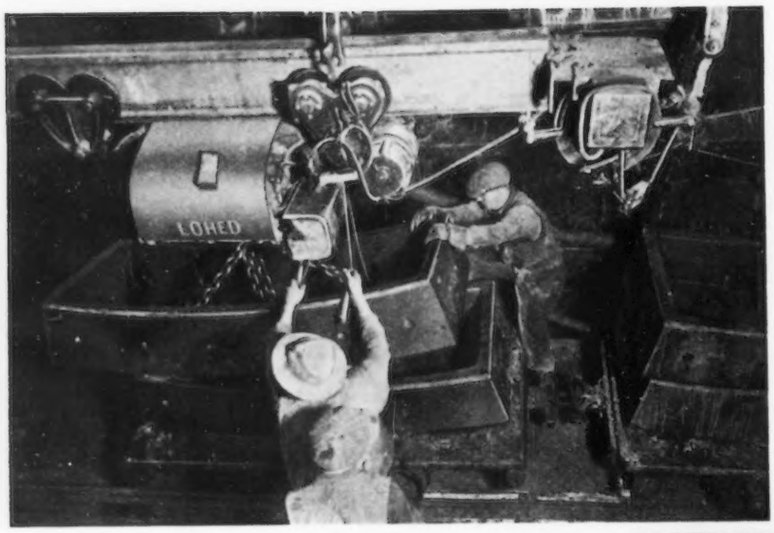


FIG. 3 — Industrial Brownhoist 25-ton Diesel locomotive crane handling pig iron with magnet in the yard of a well-known steel plant.



car and others put on. Cars leave every day over a definite route, so delays are minimized. No rehandling of goods packed in the car is required when any particular shipment is taken out.

Typical handling equipment is shown in Fig. 2, an installation of a Whiting Corp. 10-ton 52-foot span gantry crane in the Erie, Pa. yards of the Erie Railroad. Two railroad tracks are spanned, and a cantilever extension runs out over the driveway alongside the tracks. The crane moves under its own power up and down its own tracks extending for several hundred feet down the length of the yard.

anywheres within the effective area of reach of the boom.

Less-than-carload freight shipments used to present many difficulties of handling, or traffic delays, and of costs. Box cars were used, and, unless the shipper was willing to pay for a whole car while using only a small part of one, it was necessary to wait until other shipments could be gathered for the same point before the shipment actually was started on its way. Nowadays a cubical metal container is brought by truck to the shipper, he packs his goods therein and seals the doors, the container goes by truck to the railroad yards and there, with about a dozen other exactly similar containers, is loaded onto a single gondola car. At any point along the railroad line between the original shipping point and the final car destination, one or more containers may be taken off the

ABOVE

FIG. 5 — American Engineering Lo-Hed electric hoist in close quarters work in the Midtown Hudson Tunnel between New York and New Jersey.

o o o

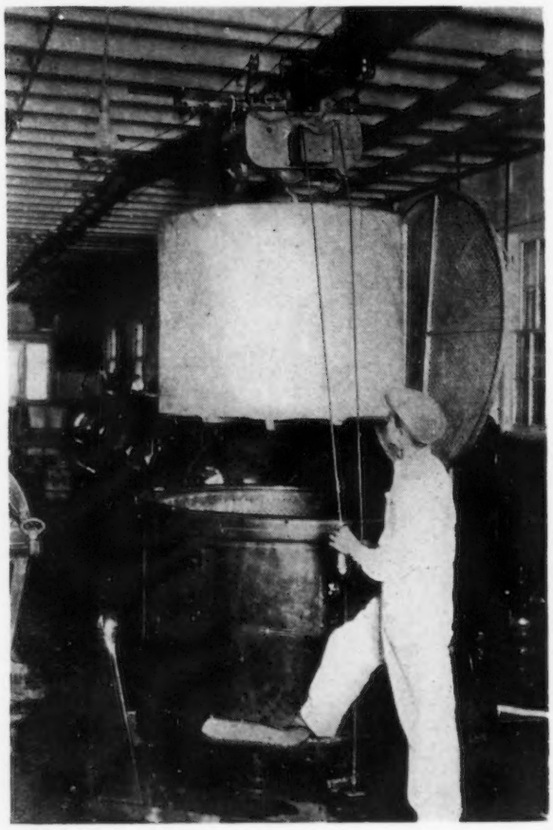
AT RIGHT

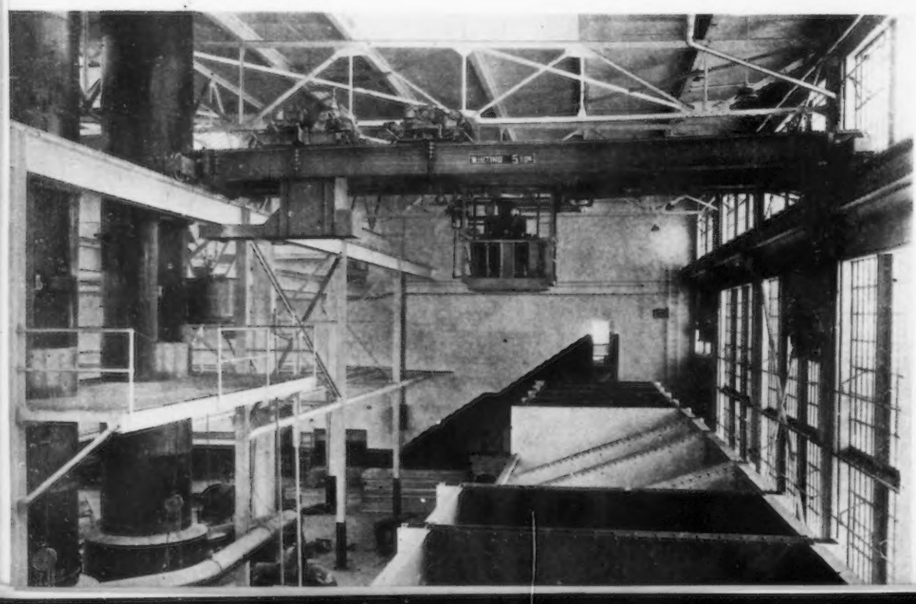
FIG. 6 — American Engineering Lo-Hed electric hoist removing basket from an extractor in a large commercial laundry.

o o o

BELOW

FIG. 7 — Whiting Corp. "wishbone" charging system on Whiting Crane, at one of the foundries of the Canadian National Railways.





Trucks bring the containers down the driveway to the car to be loaded. The crane hoist picks them up by four chains hooked into permanent eyes in the roof of the containers, swing them through the A-legs of the gantry and drop them exactly where required in the railroad cars. Similar gantrys, or fixed-position boom hoists at stations along the line lift the proper containers out of the cars for delivery by truck to the consignees. Goods are at all times protected,

and delays and rehandling costs cut to the minimum.

In Fig. 3 an Industrial Brownhoist Corp. 25-ton capacity Diesel locomotive crane is shown in the yard of a well-known steel company, handling pig iron coming in on railroad cars, to and from the stock-piles. A generating set in the cab of the crane furnishes the electricity required for the lifting magnet. This crane is completely self-contained, can move itself anywhere on standard gauge railroad tracks, and will cover an effective area from any one setting of well over 100 feet in diameter with its 360-degree swing boom. For heavy operations the magnet is detached from the hook of the hoist, and various slings or grabs used to handle the loads.

In marked contrast to the all-out-of-doors available for such car-dumping procedures is the condition illustrated in Fig. 5. During

AT RIGHT

FIG. 8 — Electric hoist between two American Monorail overhead track systems, used for lowering engines from storage room to assembly floor below.

o o o

BELOW

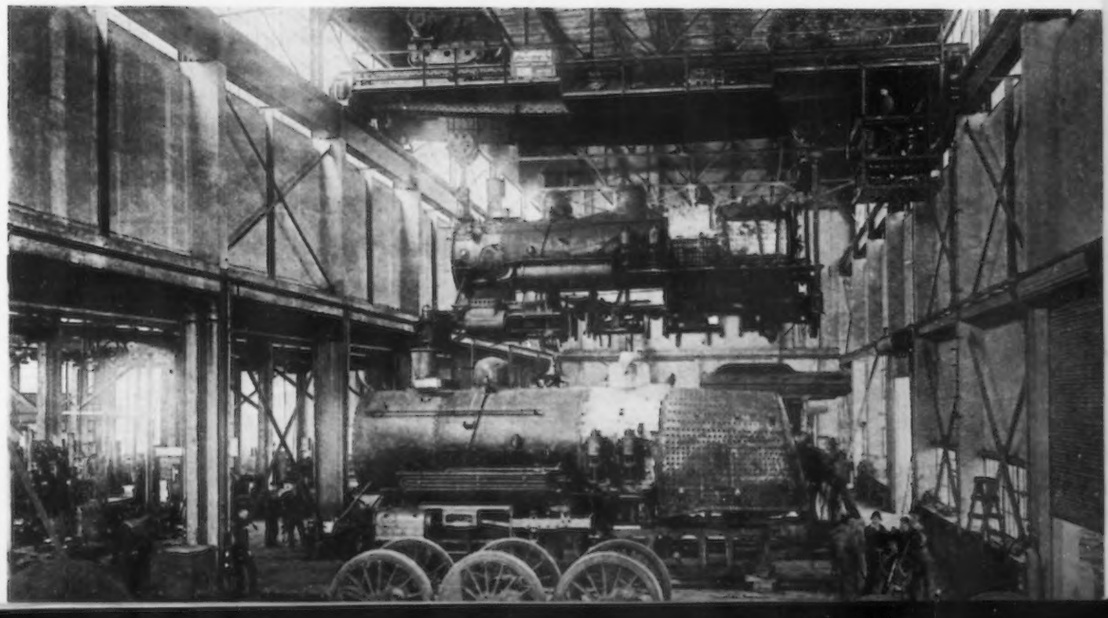
FIG. 9 — Cleveland Crane & Engineering 10-ton welded crane picking up a heavy sling-load of steel tubes in a large steel plant.

o o o

AT RIGHT

FIG. 10—Harnischfeger 100-ton double trolley crane picking up one locomotive and dropping it on the other side of another locomotive.

o o o



the construction of the new $75,000,000 Midtown Hudson Tunnel connecting for the second time the New York and New Jersey shores for vehicular traffic, American Engineering Co. Lo-Hed electric hoists have been used for handling the muck conveyors and, as is shown here, the heavy cast iron tunnel sections. These hoists require very little headroom for operation, as may be seen. The hook can be raised to within almost a foot of the lower flange of the I-beam on which the trolley runs. This is unusually severe service, for the hoists must withstand not only the abuse of heavy work carried on at top speed, but must carry on in an atmosphere which is always damp.

Limited headroom conditions are not peculiar to construction work, however; and while Fig. 5 has been shown as illustrating an extreme condition, Fig. 6 is included here to prove that conditions almost as limiting are to be found in the plant. Most of the larger commercial laundries today handle extraction baskets with electric hoists. The headroom required by such a hoist is, of course, quite important, due to the height of the ceiling. In this case a standard American Engineering Co. Lo-Hed electric hoist met every condition successfully. Notice how far the hook goes up, allowing the basket to clear the extractor easily. Laundry hoists must also be drip-proof, a condition which the Lo-Hed satisfies because all gears are enclosed in a sealed oil-bath.

A special case of limited headroom occurs in the charging of cupolas. Fig. 7 is a photograph taken in one of the foundries of the Canadian National Railways. On a standard Whiting Corp. 5-ton crane a Whiting "wishbone" charging system has been installed on a Whiting underslung charging trolley, with Whiting charging buckets for charging Whiting cupolas. Quite a family affair! Notice the advantages of the wishbone. The charging bucket can be hauled up close to the wishbone arm, so that less than twice the full depth of the bucket itself is required as the clear opening in the cupola. Then, the hoisting hook which holds the charging bucket is carried at a point on the end of the wishbone arm which, at the maximum point of the trolley travel, is actually about three feet beyond the furthest limits of the crane-bridge end. The charging bucket can therefore be carried completely within the cupola stack before being discharged.

FIG. 11—Whiting special 4-barrel grab picks up four barrels of white lead at a clip to store them in five-high tiers in a storage room.

o o o

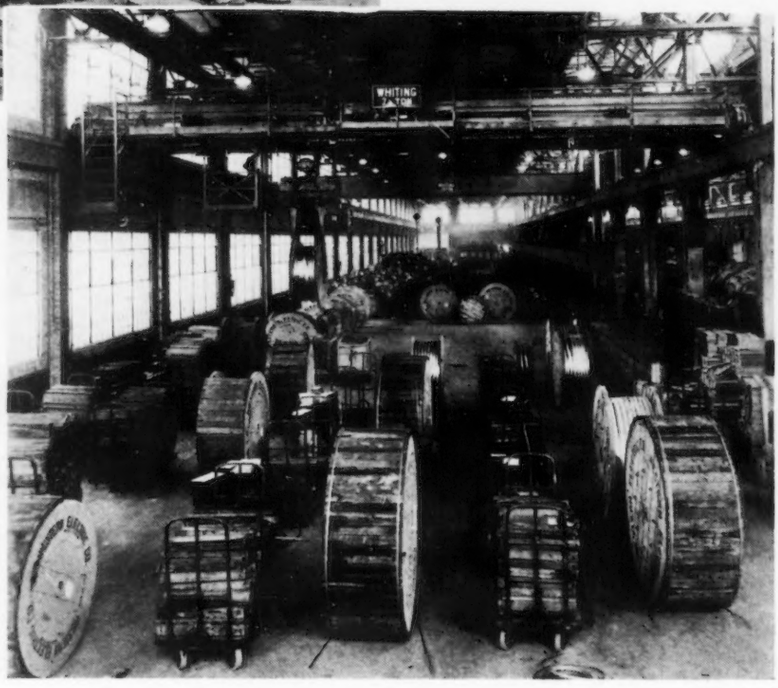


FIG. 12—Whiting 7½-ton crane equipped with special cable-reel grab at the Hawthorne works of Western Electric Co.

Grabs and Slings

Fig. 8 illustrates the use of an electric hoist as an auxiliary to an overhead conveyor system. The photograph was taken in the motor

storage department of a manufacturer of automotive trucks. Two storage bays are served with American Monorail overhead conveyor tracks, each trackage system meeting at a common hatchway. Here an electric hoist of long lift capacity, takes each engine as it comes from storage on the trackage systems, and *lowers* it to the floor below where the truck assembly line is in operation. Each engine is carried in a chain sling suspended from a hooked bar carried by the monorail trolley. The electric hoist hook is inserted by hand into the chain sling ring with the hoisting cables slack; then, when the hoist hook is pulled up the engine is automatically detached from the trolley bar, after which the hoist is reversed and the load descends to the assembly floor below.

In Fig. 9 a considerable weight of steel tubes is picked up by a somewhat similar sling of wire rope, suspended from the hook of the hoist of a Cleveland 10-ton, 80-ft. span welded crane in a large steel plant. Chain slings and rope slings make up about 50 per cent of the means whereby a hoist hook actually handles its load. Very heavy loads, and loads awkward to handle, however, require special slings and grabs. In the special sling line one which is susceptible of many variations is the locomotive sling pictured in Fig. 10. Here we have a Harnischfeger 100-ton repair shop crane with a high lift capacity, picking up a mere locomotive to set it down on the other side of another locomotive much as the casual checker player jumps one man over another. The sling in this instance is plural; that is there are two separate trolleys and hoists supporting two separate and different sling arrangements, lifting and lowering strictly in unison. When the operator in his high-flung cab plays a chord on this organ, the keys in the treble and bass registers must come down all at once, or else!

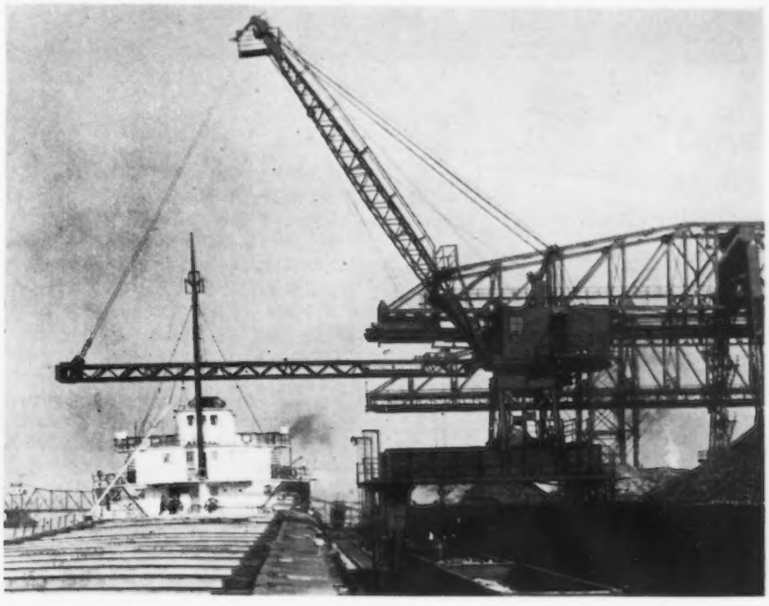


FIG. 13—Industrial Brownhoist combination electric gantry crane-locomotive crane, used to transfer pig iron from cars to lake steamers.

Whiting Corp. recently devised a unique grapple to handle four barrels of white lead at a clip. It is shown in Fig. 11, attached to a Whiting 3-ton electric crane. The operator in the cab does the trick all alone, once any four barrels are placed in line touching each other at their bulbous middles. He brings the grapple down to the line, swings the lower projecting arms through the spaces between the barrels at their leaner lower ends, and hoists. The arms embrace the barrels snugly, the tops of the barrels tilt slightly back to rest against a restraining bar of the grapple, and away go all four barrels at once, to be stacked five high in the storage room in the background until they are needed for shipment.

Whiting Corp. is also responsible for the cable-reel grab shown at work in Fig. 12 in the Hawthorne plant of Western Electric Co. The two cranes shown are Whitings, one in the background of 10-ton capacity, and one in the foreground of 7½-ton capacity; each with a span of 57 feet and a lift of 22 ft. The reel grab attached to the smaller crane is motor operated. Two vertical arms terminate at their lower extremities in inwardly turned cylindrical projections, which fit the hole in the middle of the reel cores. To pick up a reel the arms are pushed apart, slipped over the sides of the heavy cable-filled reel, then pulled together until the projecting hubs nest securely in the reel core hole. Then the reel can safely be lifted up and transferred wherever required. The work done in this particular department is called "lagging," and involves fastening narrow wooden strips across from side to side of each cable reel to protect the cable itself during shipment.

An Interesting Combination

Many unusual combinations of lifting and shifting mechanisms are possible with hoists and cranes. One of the most interesting of these which has come to the writer's attention suggests many possible adaptations to meet various circumstances. In Fig. 13 an Industrial Brownhoist Corp. combination electric gantry crane-locomotive crane is shown, as used for loading pig iron from railroad cars to lake steamers. As a gantry crane, arranged for straight line operation, the horizontal boom is equipped with a 65-inch magnet to pick up the pigs from the cars and load them into the holds of the vessel; handling approximately 175 tons per hour. For use as a locomotive crane the horizontal boom is removed. The main boom has a swing of 360 degrees, and the mechanism is then rated at 50 tons capacity. It will propel itself along the tracks and serve as an auxiliary to the ore bridge shown in the background.

Another portfolio of hoist and crane services will be published later in this series, to continue the story of out-of-the-ordinary applications.

THIS WEEK ON THE ASSEMBLY LINE

. . . General automotive shutdown early in year is forecast. Ford only producer operating near capacity.

o o o

. . . Industry's suppliers anticipate attempt to cut parts prices as prelude to car price cut.

o o o

. . . Federal court upholds city in preventing distribution of UAW paper.

o o o

. . . Auto production slumps because Ford operates only four days previous to holiday.

DETROIT, Dec. 27.—On the eve of the new year the automotive industry in Detroit presents a contrast of boom and slump. All of the activity is concentrated at the Ford River Rouge plant and certain of its suppliers who have not yet built up too great a bank of parts. On the other hand, indications are that Chrysler and General Motors plants will be almost idle. Virtually a complete shut-down for the first half of January by both of these companies is in the wind. Even a week ago the schedule at Oldsmobile called for only seven days' operation in January, about eight days in February and 12 in March. Whether this schedule has been slashed further cannot be learned, but it is known that for most General Motors and Chrysler units schedules for parts delivered are virtually non-existent.

The general belief among suppliers is that this is part of a build-up that will force them to trim their prices after the first of the month as a prelude to car price cuts. They know that no activity at all will be seen at Dodge, for instance, until Jan. 11. Plymouth probably will not produce another car until after the 15th. Suppliers expressed the sentiment that price reductions are unwarranted on the basis of material costs—and are impossible without wage reductions. On this point labor, too, expresses its fears. It is significant that neither General Motors nor Chrysler contract negotiations are being pressed by the UAW.

Ford Operating Well

Even though all of this be true, Ford, as usual, is off on another course from that of its competitors. The Rouge and the assembly plants will operate through this week and coming weeks. Assembly lines are being keyed to turn out every automobile possible, although the other departments are cut down or shut down because they have built up a large supply while the body lines at Ford's and Briggs' are getting going. The foundry, for instance, is reported to be scheduled for only about 30 per cent capacity operation. The big tie-up on bodies has held production in the Ford plants to a peak of about 4700 cars a day, while 5200 were scheduled. Approximately 6400 is capacity and the goal. More than 1000 chassis are on hand at the Rouge awaiting bodies; a free flow of these units is anticipated starting Jan. 3. In the engine division the line will be shut down, although the reconditioning of thousands of engines each week will go ahead as it did even during the worst years of the depression. The reason for shutting down the production engine line is that there are 187,000 power plants stored up plus the 45,000 engines which comprise the usual bank.

Customer inclination to pick only the cars offering new attractions this year is further illustrated by the success of the Ford DeLuxe, on which deliveries are months off, compared with the little 60-hp. car where production has slumped correspondingly to demand.

Briggs' has been on a 7-hr. day for the last three or four weeks and, to handle production on Ford bodies, has added men. Meanwhile conversation would lead you to believe that Ford will cut the work day from 8 hr. to six or seven without any reduction in pay some time shortly after the first of the year. Certainly if Ford did this, it

would hold back many prospective union joiners and, more than anything else, the UAW could not claim to have been a force in improving wage-hour conditions because, at the moment, the union is certainly not at the crest of its drive.

Dearborn Laws Upheld

A sweeping decision upholding the position of the city of Dearborn in the controversy over the distribution of literature near the Miller Road gates of the Ford company was handed down Monday by Federal Judge Edward J. Moinet. The court's decision was that it is not only the right, but the duty, of a municipality to control traffic on its streets and to enact regulations to prevent congestion. The Dearborn traffic regulation, the court found, was not discriminatory, was not class legislation and contravened no constitutional benefits of free speech and free press. The decision affects only the union's plea for a temporary order and the judge did not dismiss petition for a permanent order. It was announced by Larry S. Davidow, UAW attorney, that the union would seek to have the case brought up on its merits at a forthcoming session of the court in March.

In the week preceding the Christmas holiday, Ford operated only four days, cutting production down to 20,000 units while Chevrolet turned out 18,000 and Plymouth suffered a further drop to 6000, about half normal production. The industry's production of last week was 67,230 compared with 82,025 the previous week and 81,482 a year ago.

The Ford Decision

Dramatic, as have been all the moves taken under the present Administration, comes the decision of NRLB against the Ford Motor Co. First reaction from the Ford Motor Co. comes through Harry Bennett, whose name so often occurred in the testimony at the Labor Board hearing which preceded the sweeping decision. Mr. Bennett, personnel director of the Ford Motor Co., said: "The National Labor Relations Board report sounds to me like a page out of the United Automobile Workers' paper. It is not only offensive, but it is ridiculous. Only employees who work at the Ford Motor Co. can understand how ridiculous it is. Any further statement must come from our attorneys."

Ford's lawyers have two courses of action open to them:

(1) Immediate appeal of the board's

New Year's Statement by Alfred P. Sloan, Jr., Chairman, General Motors Corp.

TO attempt to appraise the trend of American business as we enter 1938 presents the normal difficulties of any forecast, although I believe the circumstances this year are quite unusual in character and, in some respects, very clearly defined.

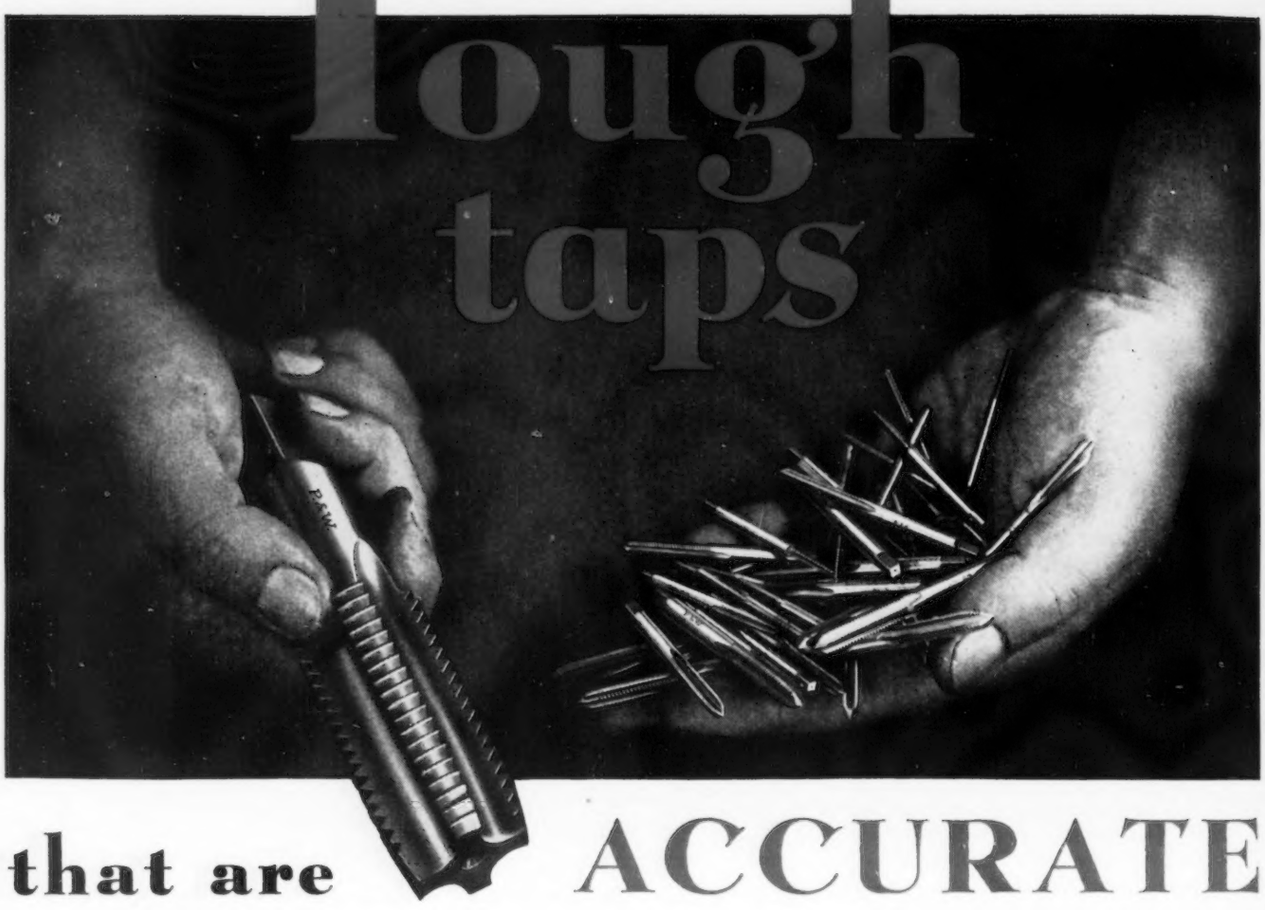
Here is the picture, as I see it:

We are in a recession in fact—important in both scope and magnitude. The situation may well develop into a depression, serious I believe more from the standpoint of duration than amplitude. There is no adequate justification for the situation in which we find ourselves. While certain economic policies are operating toward unbalancing the national economy, demanding an accounting sooner or later, the process has not continued long enough to offset the normal forces of recovery. These forces should have continued in the ascendancy for a longer period. All that being the case, why has it happened? Simply because of fear as to the future of American enterprise and the rules upon which it is to be conducted. In other words, our difficulties are political-economic rather than purely economic.

It seems to me that there is one remedy, and only one. Confidence must be re-established on a firm foundation by demonstrated fact and understanding as to objectives and methods before American business can go forward with confidence. Expediency will delay the final accounting. Panaceas will accentuate the lack of confidence already existing. As to what is going to be done about it, I do not know.

Certain it is, however, that only through a greater unity and a more effectual cooperation of all the elements involved, on sound economic lines, can a permanent basis for industrial progress be established.

Tough taps



that are ACCURATE

If you could look inside a Pratt & Whitney tap you would see its excellent tough structure, metallurgically correct to resist rough treatment. That is why a Pratt & Whitney tap does not break easily, and keeps going where others fail. It cuts smoothly because its tooth edges are sharp and hard, with just the right relief. Those edges stay sharp a long time, and cut more accurate threads than you would think possible.

The reasons for such excellent performance lie in careful steel selection and heat treatment. A P&W tap may look like any other, but it has a hard, tough accuracy that makes it outstanding. Its fine characteristics are produced by experts.

The real test of any tap is its initial cost divided by the number of holes it will tap accurately. That cost per tapped hole is the only true index of its worth. And with Pratt & Whitney taps, that cost per hole will be low — so low that you will wonder at it.

Pratt & Whitney taps include all kinds, and all sizes, small and large. Most are carried in stock for quick delivery. For complete details write to Pratt & Whitney, Division Niles-Bement-Pond Co., Hartford, Conn.

PRATT & WHITNEY

ruling to the Federal Circuit Court of Appeals.

(2) Non-compliance until the board obtains confirmation of its ruling in any Federal Circuit Court now in session or in any Federal District Court, if the circuit courts should be in vacation.

Louis J. Colombo, Ford attorney, declared "The decision of the board is based on prejudice. It is not founded on the facts in the record. It is wrong and unjust. The company will appeal the decision to the United States Circuit Court of Appeals."

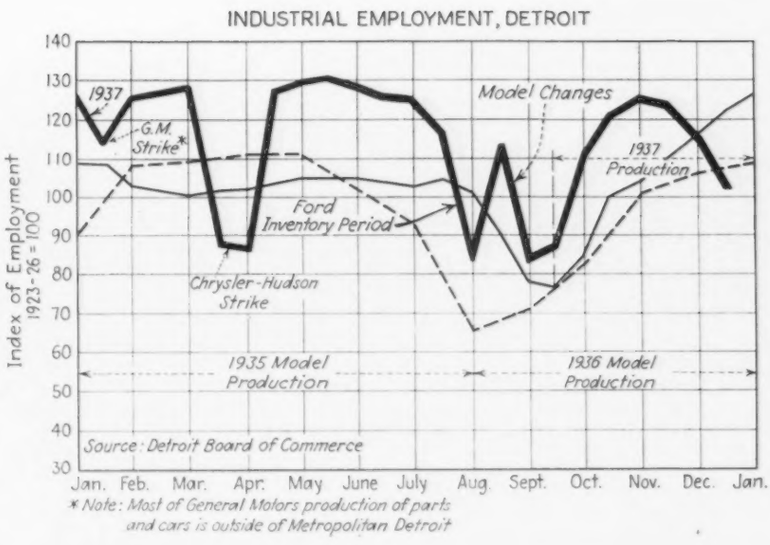
Attorneys point out that the ruling of NLRB has no legal effect until it is backed up by a court order and, until such an order is issued, the company will not be "in jeopardy."

Asked his opinion of the difference between a Supreme Court test on this issue and any of the previous Wagner Act test cases, Mr. Bennett said "This company, unlike others, has never admitted discharging a man for union activity. It has never done so and hasn't had to. The setup here is different from that in other plants and is better than anything promised by unions. The so-called hoodlums, our service men, are not here to do things like that."

In case the company elects to lead off by appealing, the Wagner Act provides that it may file with the court "a written petition praying that the order of the board be modified or set aside, a copy of such petition shall be forthwith served upon the board and thereupon the aggrieved party shall file in the court a transcript of the entire record in the proceeding, certified by the board, including the pleading and testimony upon which the order complained of was entered."

One feature of the Wagner Act is the provision that no objection that has not been urged before the board shall be considered by the court.

One thing at least seems certain. The start of the case will not be dragged out.. The ruling provides that Ford must notify the regional director in writing within 10 days of what steps have been taken to comply. The act itself provides that the petitions under the act shall be heard expeditiously and makes plentiful provision to get the case into some Federal court promptly. Of course, in the normal course of events, no action directly against the Ford Motor Co. can be taken until it has disobeyed a court order, has been ordered punished by that court and then carries the appeal to the highest court. The Ford company, it has been apparent from the first, is more than willing to carry the case to a quick conclusion.



The case stems from the riot at the Dearborn plant of the company on May 26, when representatives of the UAW sought to distribute literature to Ford workers, and has been under review by the NLRB for several months, after public hearings were held in Detroit in July. The present course of the company in preventing disturbances at its gates has consisted of pressing civic officials to enforce traffic ordinances and similar minor laws to bring about the arrest of union members. In the last few weeks between 750 and 1000 such arrests have been made, all of them without prosecution to date.

The union hails the Labor Board decision as a great victory for itself. "It evidences the intention and purpose of the Government to use its power to compel Ford for the first time in his company's history to obey the law," Homer Martin, UAW president, says, recalling that the Ford company refused to comply with the National Industrial Recovery Act and never signed the automobile code accepted by his competitors in the Blue Eagle days. Ford's contention then was that the NRA was unconstitutional. The Supreme Court later held that it was.

AIR is completely changed every few seconds around these workmen in the Chevrolet plant through the seven ventilator pipes shown. The operators finishing the top of a Chevrolet truck cab work in a special three-sided booth. Water sprays constantly down the glass sides of the booth to collect any stray dust.

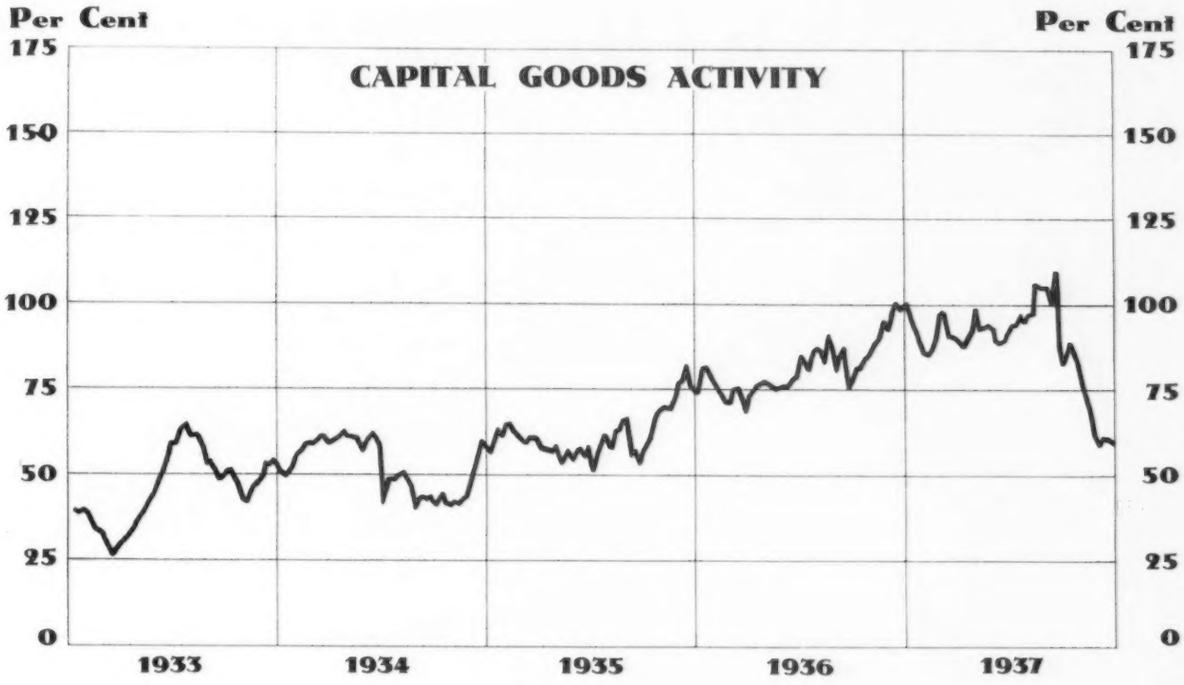
Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources.

	November 1937	October 1937	November 1936	Eleven Months 1936	Eleven Months 1937
Steel Ingots: (gross tons)					
Monthly output[a]	2,153,781	3,392,691	4,337,412	42,383,413	48,045,241
Average weekly output[a]	502,047	765,844	1,007,698	885,571	1,006,816
Per cent of capacity[a]	38.22	58.31	76.94	67.61	76.65
Pig Iron: (gross tons)					
Monthly output[b]	2,006,724	2,892,629	2,947,365	27,503,760	35,120,993
Raw Materials:					
Coke output[c] (net tons)	3,395,956	4,262,946	4,280,200	41,675,500	49,395,573
Lake Ore consumed[d] (gross tons)	2,734,504	4,203,873	4,269,049	40,087,983	52,079,489
Castings: (net tons)					
Malleable, production[e]	.....	42,953	50,934	510,022	.....
Malleable, orders[e]	.....	34,810	58,152	509,299	.....
Steel, production[e]	.....	65,957	68,874	722,076	.....
Steel, orders[e]	.....	36,837	76,394	749,650	.....
Finished Steel: (net tons)					
Trackwork shipments[a]	4,289	6,137	4,756	63,234	88,317
Fabricated shape orders[f]	136,542	46,912	121,607	1,442,474	1,517,923
Fabricated shape shipments[f]	128,556	149,308	134,115	1,426,430	1,543,959
Fabricated plate orders[e]	27,507	31,942	40,465	433,019	401,421
U. S. Steel Corp. shipments[g]	587,241	792,310	882,643	9,757,767	12,336,397
Ohio River Steel shipments[h]	70,600	89,750	127,425	1,057,871	1,167,995
Fabricated Products:					
Automobile production[i]	376,637	337,979	394,890	4,097,316	4,669,629
Construction contracts[j]	$198,465‡	$202,081‡	$208,081‡	$2,475,600‡	$2,703,672‡
Steel barrels shipped[e]	.....	938,443	733,215	7,705,012	.....
Steel furniture shipments[e]	.....	$1,918‡	$1,646‡	$17,133‡	.....
Steel boiler orders[e] (sq. ft.)	595,506	611,720	937,437	9,639,418	9,219,150
Locomotives ordered[k]	13	0	174	354	291
Freight cars ordered[k]	1,625	21	1,550	40,208	49,451
Machine tool index[l]	127.7	152.0	147.1	134.0†	163.5†
Foundry equipment index[m]	128.0	185.2	200.4	178.6†	181.8†
Non-Ferrous Metals: (net tons)					
Lead shipments[n]	33,853	39,292	50,313	391,123	541,919
Lead stocks[n]	113,573	100,646	176,960	.....	.....
Zinc shipments[o]	32,221	40,345	56,887	502,457	540,111
Zinc stocks[o]	42,984	25,817	57,527	.....	.....
Tin deliveries[p] (gross tons)	5,195	8,210	5,345	67,075	78,645
Refined copper deliveries[q]	37,025	48,440	75,409	729,931	843,105
Refined copper stocks[q]	221,676	182,911	171,291	.....	.....
Exports: (gross tons)					
Total iron and steel[r]	.....	522,611	203,297	2,709,853	.....
All rolled steel[r]	.....	264,809	123,159	1,040,630	.....
Finished steel[r]	.....	217,787	100,344	922,350	.....
Scrap[r]	.....	184,547	69,113	1,773,836	.....
Imports: (gross tons)					
Total iron and steel[r]	.....	37,186	61,970	614,245	.....
Pig iron[r]	.....	11,870	10,615	155,486	.....
All rolled steel[r]	.....	15,964	20,656	250,626	.....
British Production: (gross tons)					
Pig iron	762,300	769,600	643,100	7,010,200	7,711,400
Steel Ingots[s]	1,178,300	1,133,600	1,001,300	10,679,800	11,860,200

†Three months' average. ‡000 omitted.

Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] United States Engineer, Pittsburgh; [i] Preliminary figures from Automobile Manufacturers Association—Final figures from Bureau of the Census, U. S. and Canada; [j] F. W. Dodge Corp.—37 Eastern states; [k] *Railway Age;* [l] National Machine Tool Builders Association; [m] Foundry Equipment Manufacturers Association; [n] American Bureau of Metal Statistics; [o] American Zinc Institute, Inc.; [p] New York Commodities Exchange; [q] Copper Institute; [r] Department of Commerce; [s] British Iron and Steel Federation.



THE IRON AGE Weekly Index of Capital Goods Activity

(1925-27 = 100)

Week ending Dec. 25	59.2	Same week 1934	60.1
Preceding week	60.1	Same week 1933	54.5
Same week last month	60.9	Same week 1932	40.1
Same week 1936	98.4	Same week 1931	55.7
Same week 1935	75.8	Same week 1930	67.7
		Same week 1929	80.4

ACTIVITY in the production and distribution of durable goods ended the year 39.2 points below the last week of 1936 and 11.2 points under a comparable week in 1929, according to THE IRON AGE seasonally adjusted index of capital goods activity. The week's decline of 0.9 points brought the index down to 59.2 per cent of the base average. The short holiday week lowered the steel production series to 30.1, an adjusted decline of 4.1 points from the previous week's level. Construction awards took the usual year-end spurt, and despite the short week amounted to $9,768,000 more than the preceding week, with public construction awards accounting for the bulk of the increase. Automobile production, computed on a daily basis, was slightly above the previous week, and the index moved upward 7.5 points to 76.1 per cent of the 1929 average. Seasonal losses of 4.2 points and 3.7 points, respectively, were recorded in the Pittsburgh and lumber carloadings series.

	Latest Week	Change from Preceding Week
Steel production (per cent of capacity)	23.5	—4.0
Automobile production (number of cars and trucks)	67,230	—14,795
Railroad loadings of forest products (number of cars)	24,011	—2,897
Pittsburgh industrial production and shipments (index number)	54.1	—4.2
Construction contracts awarded (total value)	$45,474,000	+$9,768,000

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

WASHINGTON. . . . . .

. . . Washington still works on theory that forays against "big business" are popular and may help to bring recovery.

o o o

. . . Congress leaves "vacuum of accomplishment" during special session with tax group doing only constructive job.

o o o

. . . Hopes of AFL and CIO peace blow up as rival leaders blame each other for deadlock in organized labor movement.

o o o

By L. W. MOFFETT
Resident Washington Editor
The Iron Age

o o o

WASHINGTON, Dec. 28. — High prices, says the New Deal, are responsible for the "recession." Disregarded is the unprecendentedly high cost of Government, with its bewildering maze of new bureaus and personnel seeking to control and regulate almost every conceivable economic activity. Taxes and more taxes, direct and hidden, necessary to maintain the vast and ever-growing Government machine as it grinds out fiats, rules, regulations, orders, etc., are given no consideration as elements in high prices.

Uncertain, confidence-shaking, quick changing Administration policies escape attention as an influence in bringing on the "recession." Rather the Government sets up for itself a doctrine of infallibility. The sinner is business and the iniquity is high prices. That is big business.

Like the farmer and organized labor, little business is without sin, in the political eye. Indeed it is the victim of the big sinner, the country is told, though efficient little business does not cast itself in the role of the persecuted.

Moreover, the dividing line between big and little business has not been made clear by exponents of little business, who, armed with oratory, are always on the trail of the dragons of big business.

Attacks Found Popular

Anyhow Washington proceeds on the basis that forays on big business still go over, even as it makes gestures toward the necessity of Government-business cooperation to revive industry and employment. Most definitely the movement should be encouraged on all sides, but it certainly is not being promoted by seeking to conceal Government mistakes by passing the buck to business, or by absurd charges that the press is promoting fear.

And most certainly Government mistakes have placed enormous cost burdens on business. If business is to continue it has to make up these increased costs, either partially or entirely through prices to consumers. Yet unless prices are brought down, industries are warned that they will be dragged into court and prosecuted under anti-trust laws, which the Department of Justice says are in the process of sweeping and rigid revision. Implications are given of Government control or of other sinister alternatives if big business does not lower its price structure.

"Big business jerked prices up as soon as volume began to pick up," says Robert H. Jackson, Department of Justice trust buster. "It acted on the theory that under the competitive system business had the right to charge what the markets could bear."

Prices Held Down

Wasted is the effort to show big business had held down prices when increases in wages justified jerking them up.

"If business is going to do its part to bring about revival, business must boldly reduce prices to the point necessary to cause a normal flow of goods to the consumer," continues Mr. Jackson. "Big business is not today permitting the competitive system to work."

No suggestion here that the Government boldly reduce its costs by slashing intolerable taxes and dismantling superfluities of a grotesquely topheavy machine so that industry can cut costs and therefore prices. Again, the fault is never the Government's; as usual, it is industry's. Indeed the New Deal says business does not fear Government! The Administration until recently was publicly singing the song of prosperity, "because we planned it that way."

This prosperity, handicapped

GLEAMING=

with the

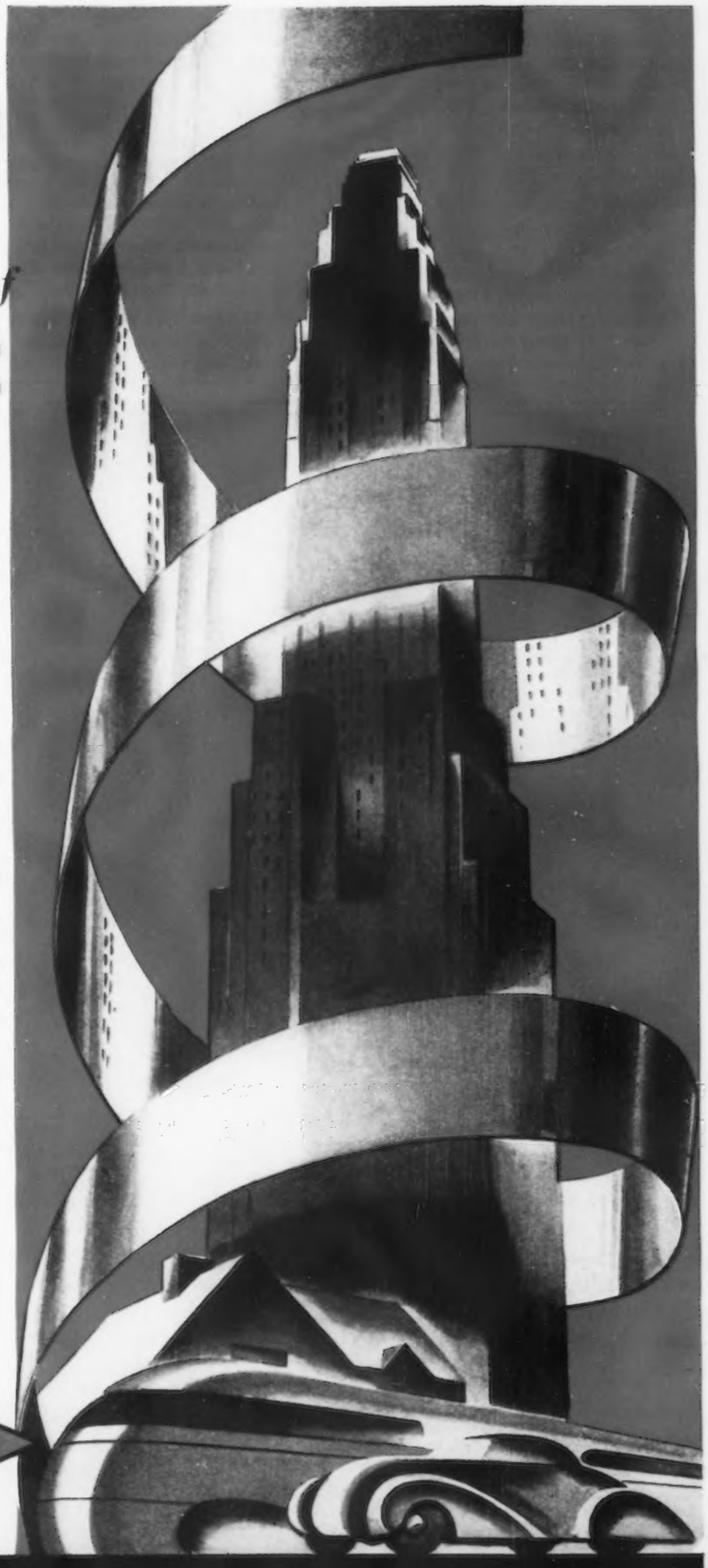
ASSURANCE *of* PERMANENCE

A product that gleams and sparkles with freshness is not only good to look upon, but it carries a suggestion of cleanliness. Buyers have indicated a preference for that type of product—particularly when the gleam carries a definite assurance of permanence.

Manufacturers can give this assurance—and many are doing so—with SUPERIOR Stainless Strip.

SUPERIOR Stainless is backed by 50 years' experience in the manufacture of Hot and Cold Rolled Strip Steels. Ahead lies our determination to render the best possible service to users of stainless and carbon strip steel. Improvement of our product is our watchword. Improvement of your product is possible through the use of SUPERIOR Strip.

Let our engineers tell you how!



Superior STAINLESS STRIP Steels

SUPERIOR STEEL CORPORATION

GENERAL OFFICE: GRANT BLDG., PITTSBURGH, PA. WORKS: CARNEGIE, PA.

though it was by high Government costs to the great disadvantage of both capital and labor, was built on an unchanged price structure in steel and other industries which are particularly under Government attacks for maintaining so-called high prices. They did not jerk up prices when volume demand set in. But they have meanwhile faced jerked up costs in the way of increased wages and taxes which Washington has insisted upon. If there is doubt as to the competitive system not working, doubters might go into the field and observe the efforts being made to secure tonnage to keep mills from sinking below their present shrunken rate of operations.

Business Takes Risks

Mr. Jackson says further: "Business men know that substantial profits can be realized with substantially lower prices if volume production is maintained."

The only people who can take the risks in this policy of price reductions, says Mr. Jackson, who thus concedes there are risks, are the business people.

There can be no quarrel that profits can be built upon lowered prices with ensuing volume demand. But the most vital point in the economic exposition is omitted. It is confidence and certainty and they in turn require a sound, reassuring Government policy, one that provides incentives to legitimate industry by encouragement rather than by discouragement in the way of constant business-baiting, and growth rather than reduction of Government costs.

Without confidence lowered prices will not suffice. They will only further restrict an already restricted market. Prospective buyers, instead of coming into the market, will remain out of the market, thinking further reductions in prices will be made. The ideal is a stabilized market at reasonable price that will move downward only as costs move downward. To achieve that condition, confidence is necessary.

Durable Quotations Differ

Mr. Jackson also disregards the fact that costs and prices in the durable goods field, built upon contracts and therefore fixed, differ from costs and prices in fast moving consumer goods.

Again admonished Mr. Jackson:

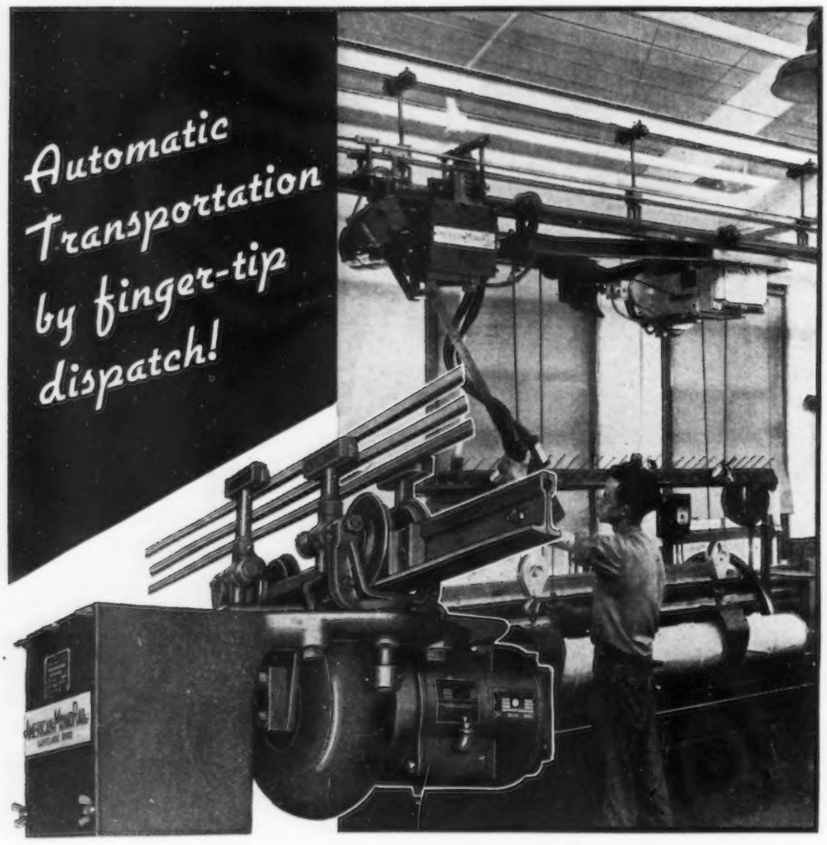
"If big business holds back from production and unemployment grows, an irresistible demand will arise which no responsible democratic Government can ignore, for more rather than less Government expenditures.

"Increased Government expenditures will mean increased taxation, and big business which already controls half of the corporate wealth of the country will have to bear the major part of that burden."

If these dire predictions of more Government and more taxation eventuate, then it will be time to call in the sheriff. But Mr. Jackson confidently says the country is not running into a major depression. Nor need it be. For the sheriff's service will not be required if the Government places its own house in order and helps as only it can to cut costs and prices in private industry so that industry can again set the wheels to buzzing full blast and restore employment. Let industry turn taxes into wages. The recent Westinghouse statement commented trenchantly on this material point.

Government Fails

Failure of the Government to share responsibility for the re-



Loads as heavy as three tons are now dispatched for automatic transportation over monorail systems by means of the American MonoTractor.

This rubber wheel drive unit successfully propels hoists, carriers and cranes at speeds up to 300 feet per minute.

It operates through track switches, up 10% grades, over scale or lift sections with local or remote control or completely automatic from central control panel. Some loading and unloading operations are also performed automatically.

For a complete labor saving system, the American MonoTractor is indispensable. Engineering service furnished without cost. Complete information will be sent on request.

AMERICAN MONORAIL CO.

13103 Athens Ave., Cleveland, O.

cession and to correct its own mistakes reflects a short-sightedness that has a counterpart in the so-called "deliberations" at the recent SWOC convention in Pittsburgh which expressed grave alarm over technological developments in the steel industry, and, perhaps through force of habit, acquired the past few years, turned to Washington to have something done about it.

Coming from one of the intelligence of Philip Murray, it is a matter of speculation as to whether the head of SWOC had his tongue in his cheek as he dwelt upon unemployment and displacement of men by new devices. Going into the dangerous field prophecy that cannot take into account new products or demand for old ones, the union set forth the view that in the next three years only 25,000 out of 125,000 workers normally employed in the sheet bar, heavy plate, sheet and black plate mills will still have jobs. The convention gravely directed its officers, as is the inevitable thing these days, to have Washington do something about it.

Ought To Be a Law

The officers were told to submit a bill—there ought to be a law—to Congress asking for a survey showing the effect technical improvements in specific industries have had by way of curtailing improvements.

Then Federal legislation would be asked to "make the proper and fair adjustment between capital and labor of the benefits derived through such technological improvements" and to offer adequate social protection to those made idle by such scientific advancements, whatever that glittering generality may mean.

Both John L. Lewis and Philip Murray, and no doubt most of their followers, know that progress in technological improvements is both inevitable and necessary. Herein lies the basis for industry within itself to reduce costs and to increase, not decrease, employment. Until the "recession" the steel industry maintained record employment. Readjustments affecting employment there always has been by reason of technological developments, but without them the steel and other industries would find themselves paralyzed by antiquity, moss-grown, empty, with no employees. Why wouldn't organized labor be acting more in its own behalf by encouraging technological developments, rather than discouraging them, by cooperating in the field of research and waste reduction—which means cost reduction and expansion of markets—together with more profits for wage distribution?

If technological development is discouraged, what becomes of labor accusation that industry is backward and does not keep abreast with modern demands? And what becomes of labor's complaint about hard, gruelling work? Does it recommend scrapping of modern mills and restoring of the old hand mills with harder labor, impossible costs and drying markets?

High prices—to use the Washington term—are relative. They can only be lowered by teamplay and the Government and labor will be the chief players by helping to cut costs through slashing taxes and other burdens thrust on them by Government and by labor doing its part in cooperating with industry in the field of modernization. And in working reasonable hours. If labor is responsible, as it now insists it is, it will turn its attention in this direction rather than suggest fool legislation or embarking on sit-down strikes.

- Two Large, Modern Plants Strategically Located at Ambridge, Pa. and Chicago, Ill.
- Production Facilities that meet every Cold Drawn Specification in Carbon or Alloy Steel.
- Precise Physical and Chemical Metallurgical Control.
- Quick Deliveries through nationally known Distributors from Coast to Coast.
- Ample Warehouse Stocks for all Emergencies.

Add them up and you will find *Wyckoff* the logical answer to your Cold Drawn Steel problem . . . for accuracy . . . for economy . . . for performance . . . for complete satisfaction.

WYCKOFF DRAWN STEEL COMPANY

Gen. Offices: First National Bank Bldg., Pittsburgh, Pa.
Mills at Ambridge, Pa. *and* Chicago, Ill.
Manufacturers of Carbon and Alloy Steels . . . Turned and Polished Shafting . . . Turned and Ground Shafting . . . Wide Flats up to 12" x 2" . . . Warehouse stocks carried by nationally known distributors

Congress Leaves Roosevelt's Five-Point Program Up In Air

WASHINGTON, Dec. 28.—Just as Congress adjourned last Tuesday leaving a vacuum of worth-while accomplishment back of it, the raging AFL-CIO peace parleys broke up, each side prepared to resume hostilities against the other.

The special session of Congress met Nov. 15 upon call by the President and failed to push to final passage any one of the five measures which the President had listed for enactment as emergency legislation. The House and Senate farm and housing bills got to conference. The House wage-hour bill was blocked and recommitted to the Committee on Labor. That is all that was done in Presidentially proposed legislation, a striking contrast with earlier New Deal days when Congress jumped through the White House hoop.

Congress has been blamed generally for pulling a total flop. However, criticism is also made of the President for calling a special session. It was contended that, since it was called, it should have voted tax relief on business, rather than be plunged into a heated controversy over legislation that, even if needed, is not of an emergency character at all.

Tax Study Completed

The most constructive job done at the session was consideration by a sub-committee of the House Committee on Ways and Means of the capital gains and undistributed profits taxes, a subject not even mentioned in the President's program.

Congress plans to enact tax revision early in the regular session. It is not probable modification will be as extensive as business wants, but it will be a help. The Housing bill, even after agreed upon in conference at the regular session, will have a doubtful value in the minds of many. It has been attacked as misleading in providing 90 per cent loans, raised from the present 80 per cent loan guarantee inasmuch as the average loan under the FHA is only 71 per cent. Argument is made, however, that the Senate restored the most constructive section of the bill which renews title I of the National Housing Act providing for modernization and repairs. Secretary Frank Carnahan of the National Retail Lumber Dealers' Association in a letter to members of the Senate estimated that the section will influence modernization and repair work to the extent of $300,000,000 a year. The section, which appears in the House bill, had been struck out by the Senate Committee on Banking and Currency.

Mileage Cost $225,000

Sad though the record of the special session was, it will cost taxpayers plenty, as usual. Included in the cost will be $225,000 which, in a jiffy, Congress voted itself for mileage, some of which will not be used. The cost of unused mileage—40c. a mile, 20c. a mile each way—will be for "phantom" freight since some members remained in Washington. The phantom freight netted by the "peepul's friend" will not be returned to the "peepul's treasury."

As for the AFL-CIO bust-up of peace talk, it at least should give the country a rest. For the country

HAVE YOU A COPY OF THIS LATEST BULLETIN?

All Geared
High-speed SUPER-SERVICE RADIALS
THE DRIVING MOTOR MOUNTED ON ARM PROVIDES PROPER MEANS FOR BETTER BALANCE OF ARM AND HEAD
The Cincinnati Bickford Tool Company
Oakley, Cincinnati, Ohio, U. S. A.

3' or 4' Arm
9" Dia. Column

Write for Bulletin R-21A and see the features that make this High-Speed Super-Service Radial so outstanding in convenience, speed, ease of operation and productivity. Arrange to see one of these machines in operation. To get greater output and to cut overhead rates this machine should be working for you now.

CINCINNATI BICKFORD

or that part of it which followed the antics of these organized labor groups, must have grown tired of their shadow-boxing and it is suspected that most of labor was more than wearied.

As for responsibility for the bust-up the public is hereby set up as a jury with the following "evidence" before it:

"The onus for the deadlock must be placed on the representatives of the AFL," said Philip Murray, SWOC president and chairman of the CIO pow-wow committee.

"The responsibility for the failure of the conference rests squarely with the CIO and those directing its destiny," declared George M. Harrison, railroad clerk, union president and head of the AFL pow-wow committee.

Machinery Trend To Family-Size Farms

WASHINGTON, Dec. 28.—The trend in the farm machinery design is toward developments in favor of the family-size farm, S. H. McCrory, chief of the Bureau of Agricutural Engineering, reported last week to Agriculture Secretary Wallace.

In a review of progress since the invention of the steel plow and the grain harvester, Mr. McCrory pointed out that there are more than 1,250,000 farm tractors in use and listed as recent developments the general-purpose tractors and the so-called "baby" harvesters adapted to small fields. There is little tendency, except in exclusively wheat regions, for farms to grow larger, he said.

Mr. McCrory wrote Secretary Wallace that farmers are getting more out of their farm machines than they did 20 years ago and said he based his deductions on the increased number of machines although the quantity of metal used in their manufacture remains about the same. Despite the current heavy purchases of new implements, the report said, large numbers of farms are badly equipped and poorly organized.

New Tin Plate Company Organized

WASHINGTON, Dec. 28.—Recently filed with the Securities Exchange Commission, a prospectus of the newly-organized Ohio Sheet & Tin Plate Co., Marietta, Ohio, provides for stock flotation of 156,000 shares, netting $497,250 of which $380,044 will be for working capital and $75,000 for modernization of the tinning department of the plant, purchased from the Hudson Sheet & Tin Plate Co., Inc. New equipment will include three automatic feeder pots, $36,000, and two annealing boxes, $24,000, while $15,000 will be spent for renovation and repairs. Raw materials to be purchased include sheet bars, $160,000; tin, $24,000 and miscellaneous supplies, $15,000.

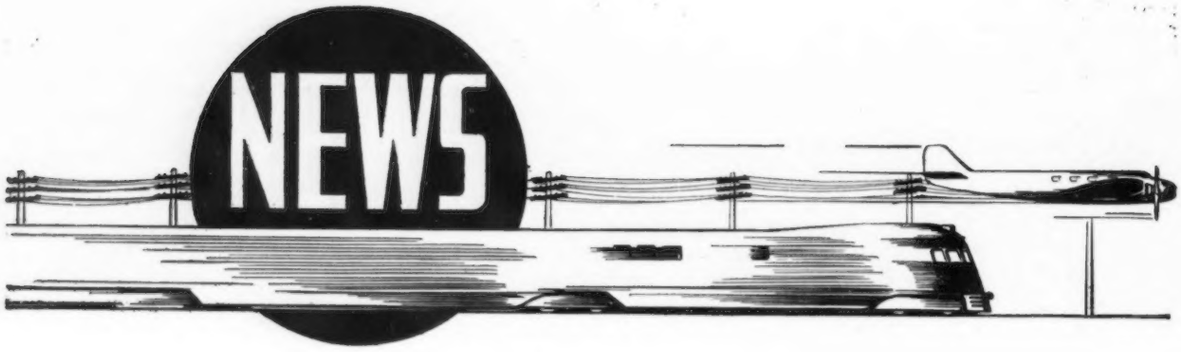
Officers of the company are D. T. Haddock, president; G. Raymond Steen, vice-president, and Leonard M. Harper, secretary-treasurer. Mr. Haddock formerly was associated with the Carnegie-Illinois Steel Corp. Mr. Steen formerly was assistant director of the State Highway Department of Ohio, and Mr. Harper formerly was with Main & Co., certified cost accountants. In addition to these officers and directors, other directors include L. Carr Seele, Youngstown Foundry & Machine Co., Youngstown, and George C. Stone, president, Castle Foundry Co., New Castle, Pa.

THIS Ajax Flexible Coupling must stand up under terrific twisting strains... Note the closeness of the bushings... Its manufacturer turned to forgings... and increased the torque capacity by 50%... The small sizes are forged by Hammond & Irving, Inc., Auburn, N. Y., on double frame 1500 lb. Erie Hammers and the big couplings on 6000 lb. Eries... Erie Hammers are well known the world over for forgings of uniform texture and quality. Give your forging requirement the benefit of Erie's 35 years' experience in hammer building and you will be exercising sound judgment ...500 forge shop owners agree that *Erie Builds Dependable Hammers.*

ERIE FOUNDRY COMPANY

ERIE, PENNSYLVANIA, U.S.A.

DETROIT 315 Curtis Bldg. · CHICAGO 549 Washington Blvd. · INDIANAPOLIS 335 Postal Station Bldg.
FRANCE Fenwick, S. A. · CANADA John Bertram & Sons Co. Ltd. · ENGLAND Burton, Griffiths & Co. Ltd.



Central Location Sends U. S. Steel To Pittsburgh, Fairless Says

CHICAGO, Cleveland and other important steel centers where United States Steel Corp. subsidiaries are located lose nothing in prestige or significance through transfer (Jan. 1) of the corporation's management from New York to Pittsburgh, Benjamin F. Fairless, president, said recently at Pittsburgh.

In an address given at a dinner held in his honor by the Pittsburgh Chamber of Commerce as part of a city-wide United States Steel day, Mr. Fairless said the corporation's far-flung properties "emphasize the strategic position of Pittsburgh as the logical location of the principal headquarters of the management corporation which has as its duty the supervision of all these tremendous activities.

"Broad as are these activities in the greater Pittsburgh area, they are but a part of the nation-wide commercial and industrial activities of the subsidiaries of the United States Steel Corp., and I want to say in the strongest words at my command that the step . . . does not diminish the great importance of the activities of the subsidiary companies in Chicago, Cleveland, Birmingham, Duluth and San Francisco.

"The organization of the United States Steel Corp. of Delaware does not destroy the individuality of these subsidiary companies," Mr. Fairless said. "In its essentials, it is a simple step, taken to accomplish a closer cooperation and better coordination of activities, while preserving the autonomy of the operating companies. The decision to center the principal headquarters of the new management company in Pittsburgh was based upon its central location and its general atmosphere of steel operations."

$350,000,000 For Continuous Mills

APPROXIMATELY $350,000,000 has been invested by the steel industry in continuous sheet and wide strip mills since the American Rolling Mill Co. announced 10 years ago the development and successful operation of the first continuous sheet mill, Charles R. Hook, president, said. The first sheet was rolled by the continuous process at Ashland, Ky., in 1923, but it was not until 1927 that the process was formally introduced to the industry.

There will soon be 27 continuous sheet and wide strip mills in operation in this country with a combined annual capacity of more than 14,000,000 net tons, Mr. Hook said. In addition, a continuous mill was

NEWS AND MARKET INDEX

Personals	60	Philadelphia Market	72
Obituary	61	Scrap Market and Prices	74-75
Steel Ingot Production	62	Non-ferrous Market	75
Summary of the Week	63	Finish Iron & Steel	76-77
Pittsburgh Market	64	Warehouse Steel Prices	78-79
Comparison of Prices	65	Pig Iron & Raw Material Prices	80
Chicago Market	67	Fabricated Steel	81
Cleveland Market	69	Machine Tool Activity	82
New York Market	71	Plant Expansion & Equipment	83

recently placed in operation in Germany and another is under construction in Wales.

Mr. Hook, whose company has licensed all the continuous wide strip mills in the industry, said he did not fear over-capacity in normal times because the continuous mills, by improving the uniformity, size range and quality of iron and steel sheets, and at the same time substantially lowering production costs, have greatly expanded old markets and created many new markets for their products.

1937 Steel Ingot Output 50,250,000 Tons, Institute Estimates

IN his year-end review of the steel industry, Walter S. Tower, executive secretary of the American Iron and Steel Institute, estimates production of steel ingots, including electric and crucible, for 1937 at 50,250,000 tons, an increase of about 5½ per cent over 1936. This figure places 1937 as the third best year in steel production, the first having been 1929, which had a total of 54,850,433 gross tons, and the second was 1928, with a total of 50,325,393 tons.

"The output for 1937," Mr. Tower comments, "recorded the fifth consecutive yearly increase since 1932, but the gain this year was smaller than for any other year since 1933."

"With a swiftness unprecedented in the history of the industry," Mr. Tower says, "the (production) rate dropped from 80.4 per cent about the middle of September to a level estimated for the month of December at about 27 per cent."

In explanation of the erratic character of steel production in 1937, Mr. Tower ascribes the heavy forward buying in the early months of the year to the unsettled labor situation in industry generally; and by an increase in steel prices made necessary by higher costs, especially of labor and raw materials.

Payrolls of the industry, it is stated, established a new record in 1937 with a total estimated at $975,000,000, a gain of about $200,000,000, or 25 per cent, over the $758,060,000 paid to steel workers in 1936. Employment rose from 537,000 in December, 1936, to 603,000 in August, 1937. By October, the latest month for which these records are available, the total number of employed had dropped only to 586,000, only 3 per cent less than the September total, although output of steel ingots in October was 21 per cent less than in September. "This maintenance of the working force," says Mr. Tower, "was accomplished by reviving the share-the-work program for spreading employment."

It is estimated that appropriations in 1937 by steel companies for the construction of new plants and installations of modern equipment totaled about $300,000,000, bringing total expenditures for such purposes within three years to $650,000,000.

Accept Collective Bargaining Generously, Purnell Advises

COLLECTIVE bargaining "is a good thing and should be accepted generously by management," Frank Purnell, president of Youngstown Sheet & Tube Co., said in a statement in the Youngstown Sheet & Tube employees bulletin.

"The things which the average workman really desires are legitimate and worthy of every consideration," Mr. Purnell said. "In the attainment of them neither the government nor labor leadership can supplant the cooperation of an enlightened management which maintains that direct contact with its employees.

"Any political or labor leadership which seeks more from industry than industry can afford to give is basically wrong and any employer, who pays less in wages and who is less liberal about other conditions of work than his industry can afford, is inviting trouble for himself, his company and his industry."

"Both the company and the employee, when he is hired, should be willing to assume that the job is a reasonably permanent one, provided the man shows an aptitude for or a reasonable efficiency in the work," said the Sheet & Tube executive, who recently made a similar statement to the National Industrial Conference Board in New York.

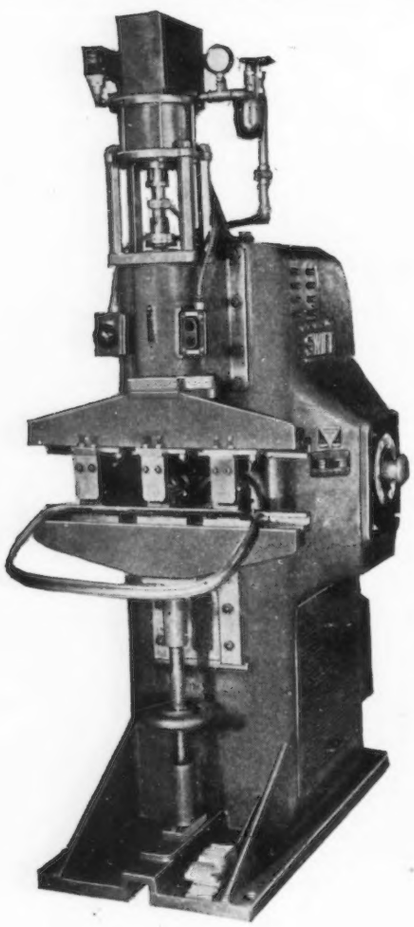
"In my opinion you cannot have prosperous industry and unprosperous labor any more than you can have unprosperous industry and prosperous labor," he said.

"An employer cannot expect loyalty and enthusiasm from an em-

CONSTANT BOUILLON (at left), chief engineer of the Hendey Machine Co., Torrington, Conn., was the recipient of congratulations and testimonials from the company and his associates on the completion, Nov. 12, of a half century connection with the company. W. P. Norton (at right), is the inventor of the quick change gear box as first applied to Hendey-Norton lathes in 1892. David Ayr, president, is in the center.

ployee if it regards him merely as an item required in production, to be put to work or laid off in the same impersonal way that a machine would be operated or shut down.

Pittsburgh Piping & Equipment Co., Pittsburgh, has appointed Garrett Burgess, Inc., Woodbrook Building, Detroit, as district representative. Garrett Burgess, Inc., will represent both the piping division, which fabricates and erects power and process piping systems, and the alloy division, which specializes in the fabrication of stainless steel piping tanks and vessels.



3 projection welds per stroke of machine

●

SWIFT ELECTRIC WELDER CO.,
6560 EPWORTH BLVD., DETROIT

Welding machines hand, hydraulic, cam or air operated of the following types: spot, seam, projection, flash, butt, flue and pipe, also gun welding units.

Wheel Technical Board Organized

THE American Rolling Mill Co., Bethlehem Steel Co., Carnegie-Illinois Steel Corp., Edgewater Steel Co. and Standard Steel Works Co., have formed the "Technical Board of the Wrought Steel Wheel Industry."

The purpose of the board is to make an organized and coordinated attack on technical problems presented by the increasingly difficult requirements of railroad service, to collect information regarding the performance of wheels, and to establish channels of communication and cooperation between the wrought steel wheel manufacturers and the railroads on engineering problems.

Charles T. Ripley, formerly chief mechanical engineer of the Atchison, Topeka & Santa Fe Railroad, has been appointed chief engineer of the technical board.

The other members of the board are technical representatives of the above mentioned manufacturing companies, and the cooperative work will be supported by the research and manufacturing facilities of the wrought steel wheel industry.

The headquarters office, 310 South Michigan Building, Chicago, will be opened Jan. 1, 1938.

Cartel Studies American Agreement

LONDON *(Special Correspondence)*.—A careful study of the recent agreement with American steel exporters was made at the quarterly meeting of the joint coordinating committee of the European Steel Cartel, recently held at Dusseldorf. A comprehensive review of the export position was also made.

In spite of the present dimunition in demand, the meeting unanimously agreed that the maintenance of the present prices was entirely justified. At the same time account will be taken of any claims by buyers which are recognized as having foundation. With regard to galvanized sheets, it was agreed, as a result of the fall in zinc in recent months, to reduce the price of such sheets by 15s. to 25s. ($3.75 to $6.25) a ton, according to thickness.

The committee further decided that in order to adjust the price of ordinary heavy sheets to American prices on the export markets it would be necessary to allow some small reductions in prices for this product. At the same time, it was decided that there was no necessity for any reduction in the prices of shipbuilding sheets, commercial sheets, machine wire, and average and thin sheets.

It is stated that the committee made definite progress toward the formulation of certain proposals which will require ratification by the American industry. The committee will give further consideration to the question of American exports at its meeting next March.

Czechoslovakia to Buy 57 Locomotives

THE Czechoslovak Ministry of Railways is examining bids of domestic manufacture for the delivery of 57 steam locomotives costing approximately $2,345,000, according to the Department of Commerce. The locomotives are to be delivered as early in 1938 as possible.

Structural Steel Bookings Increase

BOOKINGS of fabricated structural steel in November amounted to 136,542 tons, the heaviest tonnage booked since last July, according to the American Institute of Steel Construction. Bookings in October were 46,912 tons and in November, 1936, were 121,607 tons. Orders booked in the first 11 months of this year total 1,517,923 tons, as compared with 1,442,474 tons in the comparable period of 1936.

Shipments of structural steel in November amounted to 128,556 tons and were 20,752 tons below the previous month's total and 5559 tons under the same month in 1936. Shipments for the current year to date agregate 1,543,959 tons, against 1,426,430 tons in a similar period last year.

Horace T. Potts Co. Will Reorganize Dec. 31

HORACE T. POTTS CO., East Erie Avenue and D Street, Philadelphia, iron and steel jobber, will dissolve as of Dec. 31, 1937, and a new firm, bearing the same name, will be formed with a partnership consisting of Thomas C. Potts, Harrison I. Potts, Horace M. Potts, Guy P. Bible, Morris E. Neeley, Arthur L. Collins, Claude Mengel, Thomas I. Potts and Horace T. Potts, 2nd.

..CAST IRON PIPE..

Auburn, Mass., has applied for a PWA loan to complete a water supply system to cost about $50,000.

Newburgh, N. Y., plans pipe line extensions in water system in several streets. Cost about $35,000. Financing is being arranged through Federal aid. C. R. Woodhull is city engineer.

Albert City, Iowa, plans pipe line extensions and replacements in water system. Cost about $14,000. Financing is being arranged through bond issue.

Atlanta, Tex., plans pipe lines for water system. Bond issue of $50,000 has been voted for this and other waterworks installation.

Winston-Salem, N. C., plans pipe lines for new force mains for water system in industrial area and part of northern district of city. Fund of $48,000 is being arranged, of which about $17,000 will be secured through Federal aid. Later a 1,000,000-gal. elevated steel tank and tower will be constructed on Eighth Street.

Redding, Cal., will take bids in January for pipe lines for water system and other waterworks installation. Bids recently received have been returned unopened. Winifred Wright is city clerk.

Reading, Kan., closes bids Jan. 3 for pipe lines for water system and other waterworks installation. Cost about $34,000. Emporia Engineering Co., Emporia, Kan., is consulting engineer.

Clinton, Okla., plans pipe line extensions in water system. Bond issue of $30,000 is being arranged. V. V. Long & Co., Colcord Building, Oklahoma City, Okla., are consulting engineers.

Monongah Service Co., Fairmont, W. Va., plans pipe line from Fairmont reservoir, Morris Park district, to Kingmont, about 15,700 ft., for main water supply for towns of Carolina, Monongah and Idamay. Cost about $25,000.

Basile, La., plans about 10,000 ft. of various sizes for water system. C. W. Owens is engineer.

Highland Park, Tex. (suburb of Dallas), plans about 15,000 ft. of 14 to 6-in. for extensions in water system. Fund of $360,000 is being arranged, about one-half through Federal aid, for this and other waterworks extensions, including equipment in two pumping stations and other waterworks equipment.

Long Beach, Cal., closes bids Jan. 4 for 5672 ft. of 6-in., and 513 ft. of 8-in. for installation in parts of Wardlow Road, Baltic, Denver and Santa Fe Avenues and Arlington Street (Specifications R-983). E. L. MacDonald is city clerk.

Monroe, Wash., will hold bond election Jan. 18 to help finance construction of a new water system to cost about $107,000.

Anaheim, Cal., has opened bids on 16,950 ft. of 4 to 10-in. pipe and 10,000 lb. of fittings.

Seattle, Wash., which was scheduled to open bids Dec. 27 on 42,808 ft. of pipe has rescinded bid call. New opening date will be set after bonds are sold.

St. Louis Steel Castings Co., St. Louis, has increased its capital stock from $90,000, divided into 900 shares of $100 par value, to $300,000, divided into 30,000 shares of $100 par value.

PUNCHES • SHEARS • SPACING TABLES

PRESSES • DIES • METAL-FORMING MACHINERY

BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

Sensational New

THOMAS Inclinable Power Presses

Only Thomas has ALL these money-saving features:

- Accurate tool alignment
- Adequate Lubrication
- Low-Cost Maintenance
- Patented Safety Clutch
- Adjustable new three-point gibs with large wearing surface and permanent alignment of slides
- Produces Better Stampings; Lowers Tool Costs

Be sure to send for Specifications

THOMAS

MACHINE MANUFACTURING COMPANY

Name changed from Thomas Spacing Machine Co.

PITTSBURGH, PA.

FABRICATING MACHINERY

Maintenance

WELDING AND CUTTING EQUIPMENT

WELDIT MODEL-'S' *Cutting* **TORCH**

For general cutting. Furnished with Monel heads and tubes. Optional heads 70°, 90° or straight. Length 21". Weight 2 lbs. 12 oz. Thousands in service.

WELDIT MODEL P-30 *Welding* **TORCH**

For general welding. Tip sizes 3 thru 12. Length 18". Weight 1 lb. 9 oz. A very popular seller for all kinds of maintenance work.

WELDIT ACETYLENE CO.

641 BAGLEY AVE. DETROIT. MICH.

test these **TORCHES** *Free* • FOR TWO WEEKS IN YOUR PLANT

British Steel Trade Prosperity Expected Through 1938 at Least

LONDON (*Special Correspondence*). — British steel output reached a new record during November, the total being 1,178,300 tons, which means that the United Kingdom is producing at the rate of about 14,000,000 tons a year. The peak level during the war period was 9,750,000 tons annually. The increased output is going into immediate production. The new total is 44,700 tons more than in the preceding month and 15,300 tons in excess of the previous record of 1,163,000 tons set up in September.

A denial of all rumors that the steel industry will soon begin to slow up has come from no less a figure than Alexander Williamson, who has wide practical acquaintance with the industry's problems. In 1932 Mr. Williamson retired from the board of the English Steel Corp., after 25 years in the Vickers organization, and began his present association with the United Steel Companies.

"The suggestion of a slowing down in industry is the direct opposite of our experience," declared Mr. Williamson. "We are having greater pressure put on us for deliveries today than we have had since the present increased activities started. Not only are we being pressed today, but we have also been pressed to accept contracts for some distance ahead, and as far as we are concerned there is no indication whatever of any slowing down of demand.

A manufacturer who takes a more guarded view of the future outlook is Benjamin Talbot, deputy chairman of the South Durham Steel & Iron Co. In Mr. Talbot's opinion it is futile to estimate how long the present demand for steel will continue. In so far as American experience is a pointer, the recent drastic curtailment of steel operations in the United States is a fact which ought not, he thinks, to be overlooked, although it does not follow that there will be any repetition in Britain of the decline in America, where conditions are so radically different. While recognizing that recession from the present abnormal level of activity must come sooner or later, Mr. Talbot believes that its effects can be mitigated through the postponement of certain industrial expenditures until slacker times. The existence of a tariff is, moreover, a safeguard against the foreign dumping which added greatly to the industry's difficulties in 1931-1933.

The official view of the outlook was stated at some length by Sir William Larke, director of the British Iron and Steel Federation, in a lecture before the Royal Empire Society recently. Sir William sees no grounds whatever for the suggestion of any important trade setback during 1938.

"Many producers," said Sir William, "are fully engaged well into the year already, and many consumers have reported probable increased consumption during 1938. The future may be faced with confidence, both as to demand and to progressive improvement in the delivery position.

"The British Iron and Steel Federation is cooperating to an increasing extent with suppliers of its own raw materials and with the consumers of its products. The sole object is the combined well-being of all engaged in the industry by the maintenance of stable conditions and employment at as low a price level as is consistent with efficient and profitable operation.

"The industry, prior to the adoption of protection, had repeatedly undertaken that no advance in price would be made as a result of protection, but only in respect of increased costs. In order that there should be no doubt as to this, the federation agreed, without statutory obligation, to submit costs of representative makers certified by an independent auditor, to the Import Duties Advisory Committee before any changes were made. It is difficult to see how the public interest can be more effectively protected."

"HERCULES"
RED-STRAND
REG. U. S. PAT. OFF.
WIRE ROPE

Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.

A GIANT in Strength and Endurance

MADE ONLY BY
A. Leschen & Sons Rope Co.
ESTABLISHED 1857
5909 KENNERLY AVENUE
ST. LOUIS, MO.

NEW YORK
CHICAGO
DENVER
SAN FRANCISCO

570,000 Lost Jobs In November

INDUSTRIAL employment in November declined nearly 570,000 jobs as compared with October and November weekly payrolls dropped $25,900,000, Secretary of Labor Frances Perkins reported.

Large industrial inventories caused the business recession which is "only temporary," and a natural thing which has occurred before in recovery movements, Secretary Perkins said.

"I do not see any connection between the labor fight (between the AFL and CIO) and economic conditions," she said. "No one is withholding orders because of spite."

Armco Spends $254 Per Man On Plants In 1937

AMERICAN ROLLING MILL CO., Middletown, Ohio, has spent an average of more than $254 a year for each employee for plant expansion and improvement since 1929, while the $5,000,000 improvement program in 1937 alone is equivalent to $381 per employee, Charles R. Hook, president, announced. Since 1929 the company has spent $2,291 per employee for plant improvements.

German Steel Demand Still High; Armament a Factor in All Nations

HAMBURG, Germany (*Special Correspondence*).—The very heavy demand for all iron and steel products in Germany is continuing. It will be remembered that all consumers of iron and steel with a monthly consumption of more than 30 tons received fixed allotments early this year. It has not been possible to supply the full quantities within the limits of the quotas. The industry is informed that, owing to larger raw material supplies and consequently higher production and smaller demand for armament purposes, the allotments will be fully supplied beginning with January, 1938, and it may even be possible to increase the supplies on demand. The order backlogs are extraordinary. The boiler industry, for example, reports unfilled orders in some cases up to two years, the foundries eight to 12 months. The pig iron cartel reports that the heavy demand is persisting. Export orders, which were scanty during October and November, are improving.

Rumors had been circulating that an agreement had been pending between the American and the European steel industry concerning ship plates. Prices and allotments had to be fixed for the Dutch and the Scandinavian markets. All such reports are premature. Prices for ship plates, which up to October had been extraordinarily high (£16 10s.) are at present £14 15s.

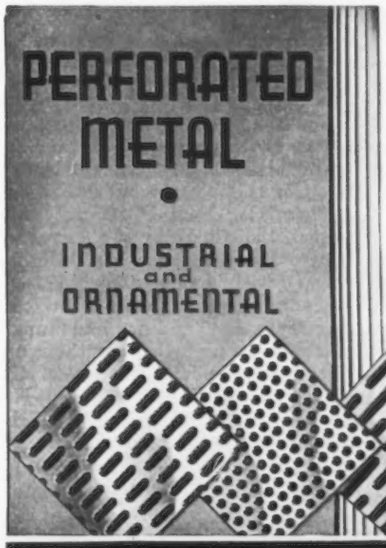
According to an agreement between the German scrap dealers and the steel industry, domestic prices for iron and steel scrap will be left unaltered during the first half of 1938, with exception of machinery cast, for which prices will be reduced by one mark to 1.50 marks.

It is now definitely established that the Reichswerke Hermann Göring will construct near Salzgitter four blast furnaces, which, however, will not come into operation earlier than the spring of 1939. The total capacity will be 1,000,000 tons annually.

FTC Schedules Metal Clad Door Hearing

WASHINGTON, Dec. 28.—Proposed rules of fair trade practice submitted by the metal clad door manufacturing industry will be the subject of a hearing called for Jan. 11 by the Federal Trade Commission.

The industry, which makes metal covered doors used principally in commercial buildings for fire protection, and reports an annual sales volume of between $8,000,000 and $10,000,000, has requested FTC approval of a score of fair trade practice rules. Deceptive advertising, false branding, defamation of competitors and discriminatory rebates and price allowances are among the practices which would be banned.

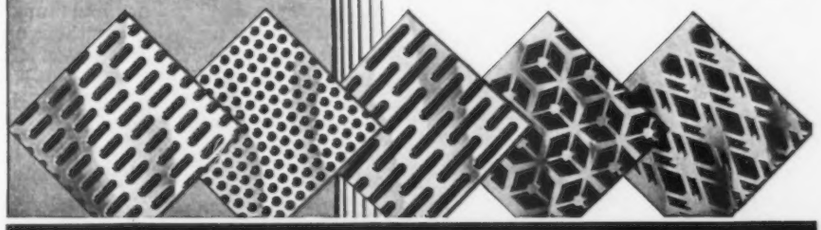


H & K industrial perforations embrace a range of sizes and shapes intended to meet the most exacting requirements of all industries.

H & K ornamental designs include standard and many beautiful and exclusive patterns suitable for architectural grilles, enclosures, ventilators, and all decorative uses.

Send us your specifications.

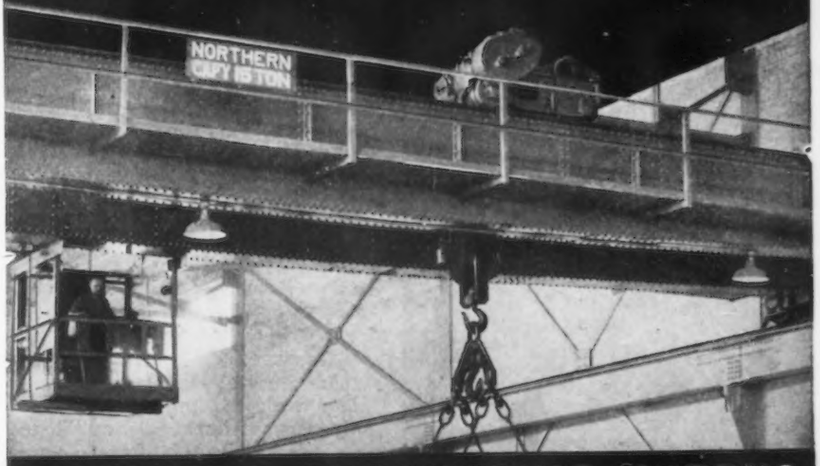
ANY METAL - ANY PERFORATION



The Harrington & King PERFORATING Co.

5657 FILLMORE ST., CHICAGO - 114 LIBERTY ST., NEW YORK

NORTHERN CRANES AND HOISTS SERVE EVERY INDUSTRIAL NEED



NORTHERN ENGINEERING WORKS

CHENE AND ATWATER STS. DETROIT, MICH.

NEW YORK CHICAGO PITTSBURGH WINDSOR, ONT.

. . PERSONALS . .

C. F. HOOD, heretofore executive vice-president of the American Steel & Wire Co., Cleveland, has been elected president of the company succeeding C. F. Blackmer, who has resigned, effective Jan. 1. M. W. Reed, vice-president, has been elected a director.

Mr. Blackmer has completed almost 40 years of service with the Wire company and one of its predecessors, the Washburn Moen Mfg. Co., having started with the latter in Waukegan, Ill., in 1898. Mr. Blackmer has been president since 1933.

Mr. Hood entered the wire business after graduation from the University of Illinois in 1915. He started first with the Packard Electric Co., Warren, Ohio, as sales engineer and assistant cable sales manager. He joined the American Steel & Wire Co. at Worcester, Mass., in 1917 as an operating clerk. With the exception of an interval from 1917 to 1919, when he was with the United States Army, he has been with the wire company since that time, moving up through the ranks as foreman, assistant superintendent, superintendent, district manager and vice-president in charge of operations. Recently he was elected a director and member of the executive committee of the United States Steel Corp. of Delaware.

❖ ❖ ❖

P. H. MACGREGOR has been promoted to the position of general manufacturing manager of Pontiac Motor Car Co. and R. H. AHLERS has been named to Mr. MacGregor's former post of general plant manager. According to HARRY J. KLINGLER, general manager, these promotions are made to free Mr. MacGregor so that he will have more time for coordinating activities between departments. The operation of the shop will be directly under Mr. Ahlers.

❖ ❖ ❖

JOSEPH HIGHDUCHECK, formerly assistant superintendent of the manufacturing equipment department of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has joined the Carboloy Co., Inc., of Detroit, as sales engineer. He has worked with cemented carbide tools since their introduction in this country in 1926 and has had numerous articles published on their application. He is a member of the American Society of Tool Engineers. Mr. Highducheck will be located at the Pittsburgh office of Carboloy.

❖ ❖ ❖

DAVE C. FORSMAN terminates a four-year connection with the Sterling-French Machinery Co., Detroit, to start Jan. 1 as representative for the Colonial Broach Co. and Michigan Tool Co. Before his connection with Sterling-French, Mr. Forsman was with Reed - Prentice Corp. for 18 years, acting as Western sales manager.

❖ ❖ ❖

WILLIAM C. CONNELLY, formerly president D. Connelly Boiler Works Co., Cleveland, has been elected president Ohio Seamless Tube Co., Shelby, Ohio, succeeding EDWIN MANSFIELD, who becomes chairman of the board. The Connelly Boiler Works plant, operated by the Connelly family for 56 years, was taken over in 1931 by the Foster-Wheeler Corp. Mr. Connelly was president of the American Boiler Manufacturers Association in 1915 and 1916 and served as chairman of the War Service Committee of the boiler industry during the World War. He is a graduate of Case School of Applied Science, Cleveland.

❖ ❖ ❖

GEOFFREY R. BENNETT has been made general manager of the Toledo Scale Co., taking over the active supervision of sales and finance in addition to his former supervision of engineering and manufacturing. Hubert D. Bennett, his brother, remains as president but has been released from many of the detailed duties of the scale business to enable him to devote full time to the big research program of the company which has already resulted in establishment of two extensive industries in Toledo. Both of the men are sons of a former general manager of the Willys-Overland Company.

❖ ❖ ❖

WILSON OLIVER, vice-president of Oliver Brothers, Inc., New York, while continuing his association with that company, has become contributing editor of *Commerce and Finance*, a fortnightly magazine for business men published in New York. Mr. Oliver will continue to write his weekly comment letters for Oliver Brothers.

❖ ❖ ❖

WALTER E. HADLEY, who has been general superintendent of the Gary works of Carnegie-Illinois Steel Corp. since February, 1935, has been named manager of operations, Chicago district, succeeding WALTHER MATHESIUS who, on Jan. 1, becomes vice-president in charge of operations, United States Steel Corp. of Delaware. Mr. Hadley will be succeeded at Gary by E. E. MOORE, who has been general superintendent of Carnegie-Illinois South works in South Chicago since October, 1935. B. M. LIVEZEY will succeed Mr. Moore as general superintendent of South works. He has been assistant to manager of operations, Chicago district, since February, 1937.

Mr. Hadley began his connection with United States Steel Corp. subsidiaries at the National Tube Co.'s McKeesport, Pa., plant and

C. F. HOOD

M. W. REED

was transferred in 1909 to the Ensley, Ala., works of the Tennessee Coal, Iron & Railroad Co. as assistant superintendent of blast furnaces. He served as superintendent of blast furnaces at the Bessemer, Robertdale and Birmingham plants of the Tennessee company. After two years as president of the Trojan Electric Steel Co., Chicago, he was appointed assistant general superintendent of Gary works in 1918 and general superintendent in 1935.

Mr. Moore has been with United States Steel Corp. subsidiaries since 1919, after he returned from oversea services in the World War. He started in the Gary sheet mill of the American Sheet & Tin Plate Co., now a part of Carnegie-Illinois. In 1923 he was transferred to the Pittsburgh district, returning to Gary in 1927. In 1932 he was made assistant to general superintendent of South works of the then Illinois Steel Co. and in 1933 was promoted to the position of assistant to vice-president. Mr. Moore was made general superintendent of South works in 1935, when the Carnegie and Illinois companies were merged to form Carnegie-Illinois Steel Corp.

Mr. Livezey has been with United States Steel Corp. subsidiaries since 1916. He served in various capacities in the Pittsburgh district and in 1926 was made superintendent of the Carnegie-Steel Co.'s by-product coke plant at Clairton, Pa. He was made assistant general superintendent of the Carnegie-Illinois, Clairton plant in 1936 and was transferred to the Chicago district in February, 1937, as assistant to manager of operations, Chicago district.

❖ ❖ ❖

HARVEY F. HEDRICK, plant superintendent of the Judson-Pacific Steel Co., San Francisco, has completed 50 years service with that company and its predecessor, Pacific Rolling Mills. To commemorate the event, employees of Judson-Pacific last week gave a banquet in his honor. The 42 men present averaged 20½ years of service with the company.

❖ ❖ ❖

JOHN J. CONN has been appointed general purchasing agent of Santa Fe System Lines, effective Jan. 1. Mr. Conn succeeds the late M. J. Collins, who for many years prior to his death had charge of Santa Fe purchases. Mr. Conn began work with the Santa Fe as office boy in the purchasing department in 1889 and has been continuously employed in various positions in that department until his promotion to assistant general purchasing agent in April, 1910, in

WALTER E. HADLEY

which capacity he has served until his appointment as general purchasing agent.

❖ ❖ ❖

WILLIAM M. BAILEY, president of the William M. Bailey Co., Pittsburgh, has been elected a director of the Wellman Engineering Co., Cleveland, to fill the vacancy caused by the recent death of Senator Atlee Pomerene.

❖ ❖ ❖

JAMES E. DE LONG, president of the Waukesha Motor Co., Waukesha, Wis., will sail from New York on Jan. 15 for a business trip of six weeks to England.

❖ ❖ ❖

CLAUDE G. MATTHEWS, since 1930 manager of the Milwaukee branch of the Graybar Electric Co., Inc., on Jan. 1 will assume new duties as manager of the New England division of the firm at Boston, Mass. The name of his successor at Milwaukee has not been announced.

❖ ❖ ❖

FRANK L. NEWARD has been appointed Michigan representative for the Gehnrich Corp., Long Island City, N. Y. He will make his headquarters at 608 Marquette Building, Detroit.

❖ ❖ ❖

J. C. Grindley, western sales manager for the Watson-Stillman Co., Roselle, N. J., moved from Columbus to Detroit, where the district sales office of the company is now located.

(CONTINUED ON PAGE 68)

...OBITUARY...

EDGAR E. ADAMS, for years vice-president and general manager, Cleveland Hardware Co., Cleveland, now the Cleveland Hardware & Forging Co., died Dec. 21 after a long illness, aged 66 years. He severed his connection with that company in 1931. A native of Cleveland, Mr. Adams became a time-keeper for the Cleveland Hardware Co. in 1890. At that time the company was engaged largely in the manufacture of vehicle hardware but later extended its activities to the automotive field and became a leading manufacturer of automobile parts. Mr. Adams, while associated with the Cleveland Hardware Co., devoted a great deal of attention to welfare work and to improving the working conditions of the company's employees.

❖ ❖ ❖

SAMUEL WILKOFF, scrap dealer in Youngstown, died Dec. 20 in that city from a stroke. He was 75 years old. Born in Russian-Poland, Mr. Wilkoff came alone to the United States early in his youth and started in the scrap business on a small scale in Beaver Falls, Pa., later going to Akron, Ohio, to open a yard with his brother, William. In 1901 a branch office was established in Youngstown and later the entire plant was moved to Youngstown. He had been active in community and civic life in that city.

❖ ❖ ❖

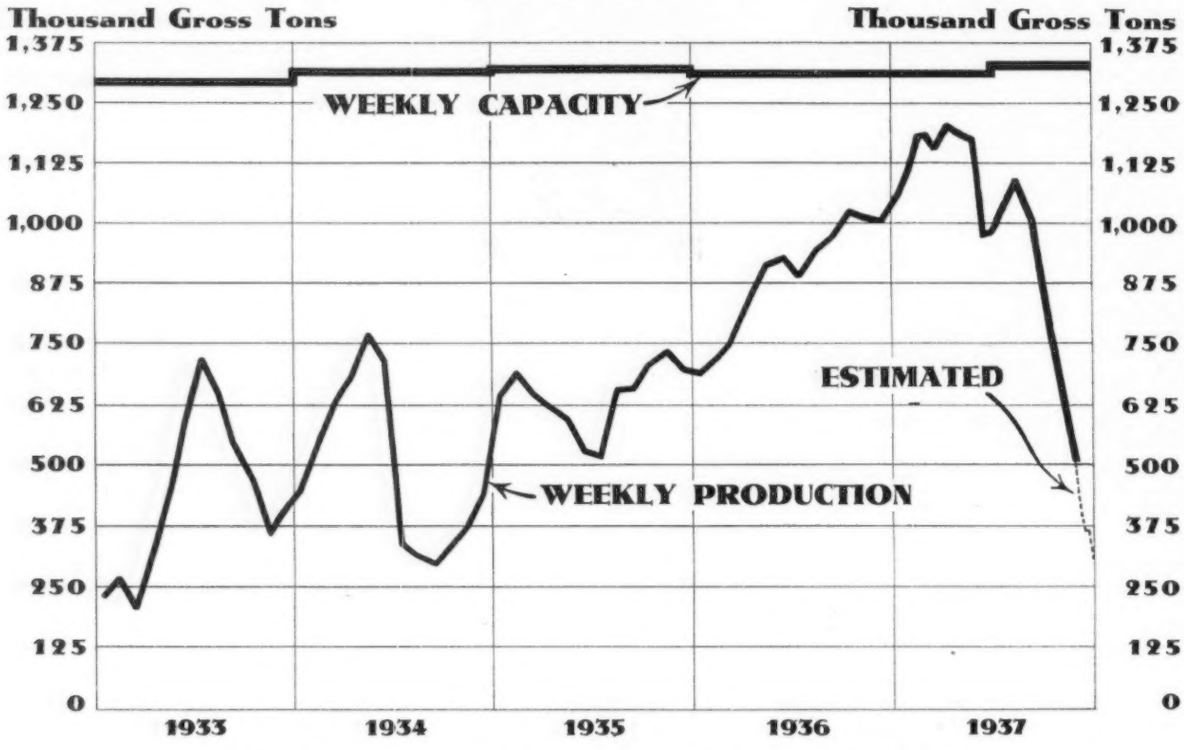
THOMAS J. PRYCE, sales manager of the Wisconsin Screw Co., Racine, Wis., died on Dec. 22, aged 50 years. He was born in Racine and at various times was associated with the J. I. Case Co., Walker Mfg. Co., and Racine Wagon & Carriage Co. in that city, and had traveled for the American Leather Belting Co., Chicago, and National Machine Products Co., Detroit, joining the Wisconsin Screw Co. following World War service.

❖ ❖ ❖

OSCAR E. LINDEMANN, a director and chief purchasing agent of the A. J. Lindemann & Hoverson Co., Milwaukee, manufacturer of stoves and ranges, died on Dec. 20 from injuries received in a fall on an icy ramp between factory and offices. He was 44 years of age and the son of Albert J. Lindemann, co-founder of the company and now chairman of the board. Three other sons are company executives, Albert L. being president; Walter C., vice-president, and Eugene A. secretary.

PRODUCTION

Average Weekly Production of Open-Hearth and Bessemer Steel Ingots by Months, 1933-1937, and Estimated Production by Weeks in 1937



Figures for the Current Week Are Not Indicated on the Chart Until the Following Week

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

	Current Week	Last Week
Pittsburgh	19.0	17.0
Chicago	22.0	23.5
Valleys	15.0	17.0*
Philadelphia	25.0	25.0
Cleveland	14.0	27.0*
Buffalo	17.5	17.5
Wheeling	22.0	22.0
Southern	47.5	37.5
Ohio River	16.0	49.5
Western	40.0	55.0
St. Louis	20.5	24.5*
Detroit	22.0	40.0
Eastern	10.0	20.0
Aggregate	20.0	23.5

* Revised.

Weekly Booking of Construction Steel

	Week Ended				Year to Date	
	Dec. 28, 1937	Dec. 21, 1937	Nov. 30, 1937	Dec. 28, 1936	1937	1936
Fabricated structural steel awards	9,710	12,100	11,750	28,875	1,049,945	1,070,855
Fabricated plate awards	1,500	2,115	2,275	11,970	117,895	224,985
Steel sheet piling awards	1,825	0	1,200	0	65,990	56,325
Reinforcing bar awards	3,820	1,700	950	2,515	294,160	329,180
Total Lettings of Construction Steel	16,855	15,915	16,175	43,360	1,527,990	1,681,345

. . . .SUMMARY OF THE WEEK. . . .

▼ ▼ ▼

. . . Steel price issue raised by Administration spokesman.

° ° °

. . . Year-end steel operations not above 20%, low since 1934.

° ° °

. . . Rail buying a factor in possible January upturn.

THE steel price issue, having been officially injected into the present uncertain situation by an Administration spokesman, may become of paramount importance in the trend of steel business during the early weeks of the new year. The steel industry, through the American Iron and Steel Institute, has recently taken cognizance of criticism of price increases made early in the year by stating that finished steel averages only 6 per cent higher than in 1926, while wage rates are 21 per cent higher and raw materials costs 17 per cent higher than in that year.

This formal attack on steel prices by the Assistant Attorney-General of the United States comes just a few weeks before the opening of negotiations between some of the steel companies and the Steel Workers Organizing Committee for a renewal of the labor contracts that were entered into last March. These negotiations, which are to be begun on Feb. 7, may have an important bearing on both wages and prices in the steel industry. Meanwhile, the possibility of a lowering of wages in the automobile industry points to the thought that is being given to liquidation of present high manufacturing costs in an effort to revive business.

THE steel industry winds up 1937 with an average operation of not more than 20 per cent, the lowest since September, 1934. Fully a dozen steel plants are shut down completely and others are operating at the barest minimum, an outstanding exception being the plants of the Tennessee Coal, Iron & Railroad Co., which have attained a 65 per cent rate by reason of recent rail orders.

Despite the financial plight of some of the railroads and the decline in carloadings, the immediate outlook for railroad buying of steel is better than in some other important fields. The St. Louis-San Francisco has placed 18,000 tons of rails and fastenings and the Southern Railway 15,000 tons of rails with the Tennessee company; the Chesapeake & Ohio is about to buy 27,500 tons of rails and 8000 tons of fastenings, and the Pere Marquette 6700 tons of rails. The Western Maryland is inquiring for 1100 freight cars, and the Canadian National for 2000 box cars, six locomotives and five passenger cars, a $9,000,000 program, part of which will be placed in the United States.

On the other hand, the automobile industry, which has led the way out of previous slumps, is at an unusually low point in production and in steel buying. Excepting Ford, the industry will be almost completely shut down during the first 10 or 15 days of January. Reflecting the meagerness of steel buying for automobile production, the open-hearth furnaces of Great Lakes Steel Corp. at Ecorse, Mich., are idle this week, an unusual development, since the depression low for this plant was about 50 per cent.

CONSTRUCTION activity is at low ebb at the moment, but a number of fair-sized projects are pending requiring plates, shapes and pipe. A sludge filter incinerator at Detroit will take 2300 tons of steel; a bridge at Charleston, W. Va., 1000 tons; steel pipe for northern Ohio municipalities, 5000 tons; another dam on the Mississippi River 5000 tons; steel work on the Grand Coulee Dam, on which bids will be taken early in January, will require about 15,000 tons.

Three mills shared in an order for 24,000 tons of 12¾-in. line pipe for shipment to South America, placed by the Texas Co. A 1350-mile gasoline line to extend from Texas to Iowa is being projected, but may not come into the market immediately.

A moderate improvement in steel plants operations is expected in the first week of January, but further gains may be slow and halting until some of the existing uncertainties have been swept away.

STEEL scrap still points upward in some markets, notably Pittsburgh and Cleveland, where advances of 50c. a ton have occurred, with no changes at Chicago and Philadelphia. This brings a further rise of 17c. in THE IRON AGE scrap composite price (Cleveland not being included in this average) to $13.75, the fourth consecutive weekly advance, and aggregating 83c. over the November low point of $12.92.

. . . PITTSBURGH . . .

. . . Ingot operations rise slightly to 19% in Pittsburgh area.

o o o

. . . Moderately upward trend expected after first of year.

o o o

. . . Texas Co. awards 24,000 tons of 12¾-in. pipe for export.

PITTSBURGH, Dec. 28.—Pittsburgh district steel ingot output this week has risen two points to 19 per cent of capacity while the Wheeling-Weirton rate is unchanged at 22 per cent of capacity. With several plants still shut down for the remainder of the year, an increase in steel-making operations is expected next week.

Finished steel specifications declined during the past week, although structural steel bookings have been comparatively strong and wire orders have not fallen off as much as had been anticipated. Sheets, strip and bar demand has been affected somewhat by shut downs at automobile plants. Export demand has shown some improvement during the past few weeks, especially for semi-finished steel products.

Finishing mill schedules will probably be at a better rate next week as many producers have been accumulating orders. Furthermore, not a small amount of specifications received during the past several days has been for shipment in January.

An award of 24,000 tons of line pipe for export has been made. The order, involving about 225 miles, was divided among three companies and approximately 14,000 tons will be fabricated in the Pittsburgh district.

A garage for the Coca-Cola Bottling Co., at Pittsburgh will take 450 tons of plates and shapes, the award having gone to Bethlehem Steel Co. The Kelsey-Hayes Wheel Co., plant at Neville Island, Pittsburgh, will take 325 tons of reinforcing bars to be furnished by Jones & Laughlin Steel Corp.

Raw material markets are dull.

Pig Iron

New business is almost at a standstill owing to year-end influences. Many manufacturing plants are shut down this week, hence both orders and shipments are off somewhat from a few weeks ago. A considerable number of unfilled contracts are being carried over to the first quarter and, although producers do not expect a sharp increase in business after the turn of the year, a slow improvement is anticipated.

Semi-Finished Steel

With a considerable number of manufacturing plants and non-integrated steel works shut down during the present week, semi-finished steel specifications adequately reflect this condition. In addition to the holiday influences, most producers are making a last-minute effort to reduce inventories. Although a better rate of incoming business is expected within a few weeks or so, no sharp increase in demand is anticipated in the immediate future.

Bars

Hot rolled bar sales during the past week have declined from the previous period due almost entirely to the holiday and inventory season. Several mills in the district have shut down this week and may accumulate enough orders to schedule a fair rolling after the first of the year. Automotive buying is practically non-existent owing to the fact that many plants are closed and most miscellaneous purchases are being postponed until after inventory season.

Cold Finished Bars

While cold finished bar business during the past week has been at an exceptionally low point, most producers look for a better rate of specifications after the first of the year. This applies especially to the miscellaneous trade which has been more or less absent from the market for several months. Inventories are known to be low and some customers have adready made commitments on certain sizes and grades for shipment after the first of the year.

Wire

Total wire specifications during the past week have not been as small as was anticipated. Some consumers have taken inventory early and have placed some specifications for certain sizes and grades for shipment after the first of the year. This applies about equally as well to manufacturers' wire orders as it does to merchant wire business. Most producers look for a consedirably better tone of jobber buying within the next few weeks owing to the depleted condition of the latters' stock. A fair portion of present bookings is for export.

Sheets

With practically all automotive plants shut down this week and a large portion of miscellaneous customers taking inventory, bookings are somewhat below the volume of a few weeks ago. Practically all specifications reaching mills this week are for material which customers cannot do without and tonnages involved are small. Producers look for a better rate of incoming business, especially from miscellaneous sources after the turn of the year.

Plates & Shapes

Plate and shape specifications during the past week have shown a slight improvement over the previous period. The increase is due to the placing of some business that was pending. Although structural awards are not very numerous, inquiries are exceptionally good for this time of the year.

Tubular Products

Texas Co., New York, has placed orders for approximately 24,000 tons of 12¾-in. line pipe involving about 225 miles for shipment to South America. The order was divided among Republic Steel Corp., National Tube Co., and Jones & Laughlin Steel Corp. Tubular specifications during the past week held up fairly well in view of seasonal influences. Orders continue to be comprised of fill-ins to round out stocks. A better volume of buy-

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Dec. 28, 1937	Dec. 21, 1937	Nov. 30, 1937	Dec. 28, 1936
Rails, heavy, at mill	$42.50	$42.50	$42.50	$39.00
Light rails, Pittsburgh	43.00	43.00	43.00	38.00
Rerolling billets, Pittsburgh	37.00	37.00	37.00	34.00
Sheet bars, Pittsburgh	37.00	37.00	37.00	34.00
Slabs, Pittsburgh	37.00	37.00	37.00	34.00
Forging billets, Pittsburgh	43.00	43.00	43.00	40.00
Wire rods, Nos. 4 and 5, P'gh	47.00	47.00	47.00	43.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	2.10	2.10	2.10	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.45	2.45	2.45	2.20
Bars, Chicago	2.50	2.50	2.50	2.25
Bars, Cleveland	2.50	2.50	2.50	2.25
Bars, New York	2.79	2.79	2.79	2.55
Plates, Pittsburgh	2.25	2.25	2.25	2.05
Plates, Chicago	2.30	2.30	2.30	2.10
Plates, New York	2.54	2.54	2.54	2.34
Structural shapes, P'gh	2.25	2.25	2.25	2.05
Structural shapes, Chicago	2.30	2.30	2.30	2.10
Structural shapes, New York	2.5125	2.5125	2.5125	2.31¼
Cold-finished bars, P'gh	2.90	2.90	2.90	2.55
Hot-rolled strips, P'gh	2.40	2.40	2.40	2.15
Cold-rolled strips, P'gh	3.20	3.20	3.20	2.85
Hot-rolled annealed sheets, No. 24, P'gh	3.15	3.15	3.15	2.80
Hot-rolled annealed sheets, No. 24, Gary	3.25	3.25	3.25	2.90
Sheets, galv., No. 24, P'gh	3.80	3.80	3.80	3.40
Sheets, galv., No. 24, Gary	3.90	3.90	3.90	3.50
Hot-rolled sheets, No. 10, Pittsburgh	2.40	2.40	2.40	2.15
Hot-rolled sheets, No. 10, Gary	2.50	2.50	2.50	2.25
Cold-rolled sheets, No. 20, Pittsburgh	3.55	3.55	3.55	3.25
Cold-rolled sheets, No. 20, Gary	3.65	3.65	3.65	3.35
Wire nails, Pittsburgh	2.75	2.75	2.75	2.25
Wire nails, Chicago dist. mill	2.80	2.80	2.80	2.30
Plain wire, Pittsburgh	2.90	2.90	2.90	2.60
Plain wire, Chicago dist. mill	2.95	2.95	2.95	2.65
Barbed wire, galv., P'gh	3.40	3.40	3.40	2.70
Barbed wire, galv., Chicago dist. mill	3.45	3.45	3.45	2.75
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$4.85

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Dec. 28, 1937	Dec. 21, 1937	Nov. 30, 1937	Dec. 28, 1936
No. 2 fdy., Philadelphia	$25.76	$25.76	$25.76	$22.3132
No. 2, Valley furnace	24.00	24.00	24.00	20.50
No. 2, Southern Cin'ti	23.89	23.89	23.89	20.44
No. 2, Birmingham†	20.38	20.38	20.38	16.88
No. 2, foundry, Chicago*	24.00	24.00	24.00	20.50
Basic, del'd eastern Pa.	25.26	25.26	25.26	21.8132
Basic, Valley furnace	23.50	23.50	23.50	20.00
Malleable, Chicago*	24.00	24.00	24.00	20.50
Malleable, Valley	24.00	24.00	24.00	20.50
L. S. charcoal, Chicago	30.24	30.24	30.24	26.2528
Ferromanganese, seab'd carlots	102.50	102.50	102.50	80.00

† This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

* The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$14.25	$13.75	$13.25	$19.25
Heavy melting steel, Phila.	14.25	14.25	13.75	16.25
Heavy melting steel, Ch'go	12.75	12.75	11.75	17.75
Carwheels, Chicago	15.50	15.50	14.50	18.00
Carwheels, Philadelphia	16.25	16.25	16.25	17.25
No. 1 cast, Pittsburgh	16.25	16.25	16.25	17.25
No. 1 cast, Philadelphia	16.75	16.75	16.25	17.25
No. 1 cast, Ch'go (net ton)	12.50	12.50	11.50	15.50
No. 1 RR. wrot., Phila.	16.25	16.25	16.25	15.75
No. 1 RR. wrot., Ch'go (net)	10.75	10.75	9.75	16.50

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.25	$4.00
Foundry coke, prompt	5.00	5.00	5.00	4.50

Metals

Ped Lb. to Large Buyers:	Dec. 27 Cents	Dec. 20 Cents	Cents	Cents
Electrolytic copper, Conn.	10.125	10.125	10.75	11.62½
Lake copper, New York	11.125	11.125	11.125	11.75
Tin (Straits), New York	*42.00*	42.375	42.50	52.25
Zinc, East St. Louis	5.00	5.00	5.25	5.45
Zinc, New York	5.35	5.35	5.60	6.82½
Lead, St. Louis	4.60	4.60	4.85	5.85
Lead, New York	4.75	4.75	5.00	6.00
Antimony (Asiatic), N. Y.	**15.00**	14.50	14.75	13.25

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Dec. 28, 1937	2.605c. a Lb.	$23.25 a Gross Ton	$13.75 a Gross Ton
One week ago	2.605c.	23.25	13.58
One month ago	2.605c.	23.25	12.92
One year ago	2.330c.	19.73	17.75
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1937	2.605c., Mar. 9	2.330c., Mar. 2	$23.25, Mar. 9	$20.25, Feb. 16	$21.92, Mar. 30	$12.92, Nov. 16
1936	2.330c., Dec. 28	2.084c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., Apr. 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., Apr. 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., Apr. 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

ing is anticipated some time in January.

Tin Plate

Tin plate specifications are off somewhat from a week ago but this condition is of a seasonal nature. Some tin plate mills are not operating this week and others are working on reduced schedule. A better rate of incoming business from general line can manufacturers is expected after the close of the year. Tin plate operations this week may be estimated at about 35 to 40 per cent.

. . . *Orders for sheets in small volume.*

CINCINNATI, Dec. 28.—Sheet demand dropped back the past week to the early December rate, mills reporting business at about 20 per cent of capacity. Current ordering is all for immediate use. Production is being held to a level equal to demand, with mills shut down through the holiday period.

. . . *Construction works offers principal outlet for steel.*

SAN FRANCISCO, Dec. 27.—Bids for furnishing bulkhead gate frame and track units for installation at the inlet ends of the outlet conduits and at the inlet ends of the station-service penstocks, and for gate frames for the penstock inlet gates at Grand Coulee Dam, hold the major attention this week along with bids for furnishing the penstocks themselves. Bids on the gate frames will be taken by the Bureau of Reclamation at Denver Jan. 4; bids are asked on the penstocks Jan. 6. About 15,000 tons are involved. As the successful bidder must do a large part of the fabrication of the penstocks at the dam site, and because freight charges will be little handicap, Chicago interests are conceded to be in a favorable position to offer low bids.

An extremely active reinforcing bar market is assured during the next fortnight. Bids have been called for on projects requiring more than 4800 tons; low bidders on an additional 4193 tons have been announced by the U. S. Engineer, Los Angeles. Grand Coulee Dam will require 1680 tons of the former total, and Hawaiian projects will take 1560 tons.

Flood control work in connection with tributary streams and washes of the Los Angeles river system continues to demand construction of small structural steel bridges by the U. S. Engineer. Awards have been made on two bridges, low bidders have been announced on three, and bids will be announced soon on two more of the group. Total tonnage on the seven bridges thus far announced is 785 tons. With one or two exceptions, demand for structural steel for industrial construction continues light.

. . . *Railroad orders 18,000 tons of rails and fastenings.*

ST. LOUIS, Dec. 28.—The St. Louis-San Francisco Railway has ordered 13,200 tons of 112-lb. rails and 4,800 tons of fastenings from the Tennessee Coal, Iron & Railroad Co. These were included in the road's 1938 emergency budget, approved by United States District Judge Moore at St. Louis. The budget totalling $3,464,336 was approved as itemized in THE IRON AGE of Dec. 9.

The Missouri Highway Commission opened bids last week for projects involving 1700 tons of structural shapes, including 900 tons for repairs to a bridge at St. Charles and 600 tons for a bridge at Moberly. The Mississippi Valley Structural Steel Co. has been awarded 600 tons for a municipal power plant at Springfield, Ill., the shapes to be fabricated at Decatur, Ill. The St. Louis Shipbuilding & Steel Co. has been awarded six barges requiring 1300 tons and a diesel twin-screw barge, requiring 200 tons of structural plates for the Socony-Vacuum Oil Co.

. . . *Additional rail orders placed; Tennessee company operating at 65%*

BIRMINGHAM, Dec. 28.—Railroads furnished most of the steel market activity last week. The St. Louis-San Francisco ordered 13,200 tons of rails and 4800 tons of fastenings from the Tennessee Coal, Iron & Railroad Co. The Southern Railway also placed an order for 15,000 tons of rails.

District operations were increased this week by the addition of two open-hearth furnaces, making a total of 11 active. The Tennessee Coal, Iron & Railroad Co. is operating at 65 per cent, a schedule that may be maintained for some time because of recent rail bookings. There are still 13 blast furnaces in use.

Other than in rail business, the demand for steel is quiet.

. . . *Connecticut program to take reinforcing steel.*

BOSTON, Dec. 28.—The year is going out with the pig iron market practically at a standstill. Early the past week there was a slight flurry of buying of Indian iron for delivery after Jan. 1, but the tonnage involved was not large. Pig iron inventories of large consumers are larger than a year ago, but those of the ordinary jobbing foundry are smaller, which leads furnace representatives to believe the market will be more active next month.

Westinghouse Gives Men $750,000 Christmas Bonus

WESTINGHOUSE Electric & Mfg. Co., East Pittsburgh, Pa., paid a special Christmas bonus to employees based on $1 for each year's service, plus $5, with 52,000 workers participating. Total amount of bonus was $750,000.

STEEL TO MEET EXACTING NEEDS

BEHIND every alloy produced by Ludlum lies the skill of fine craftsmen, the knowledge of trained technicians, and the experience of over half a century of fine steel making. These steels are as carefully "tailored" to exact specifications as the finest suit of sails. The specifications may be your own, or they can be determined by Ludlum engineers after detailed study of your products and manufacturing processes. Whatever your requirements, you are assured of individual attention and prompt service. Write to Research Dept., Ludlum Steel Co., 1230 A St., Watervliet, N. Y.

Ludlum service operates to increase the effective life of many industrial products and parts. For example, a New England concern was making thrust runners of case hardened steel until Ludlum suggested the use of Nitralloy. This suggestion brought remarkable results, increasing the service life of the runners *at least twenty times.*

LUDLUM

FINE STEELS SINCE 1854

TOOL · STAINLESS · CARBON · ALLOY

Now a full-coated

GALVANIZED SHEET

that can be DRAWN and FORMED

• Meet ZINCGRIP, the latest member of the Armco Galvanized Sheet family. Like PAINTGRIP, it is another decided improvement of an age-old product.

Up to now galvanized sheets had to carry a thin, tight coating of zinc in order to be worked at all. Armco Zincgrip gives 50 to 75% more coating protection and can be drawn and formed severely without danger of cracking, peeling, or flaking.

You can buy ZINCGRIP in either sheets or coils, in gages 16 to 28, and in any of the base metals Armco produces, including durable Ingot Iron. And you can absolutely depend on the coating adherence for work within its limitations, which are as broad as you could desire.

ENJOY

THESE BROADCASTS

Listen to the famous Armco Band and the Ironmaster — on NBC Blue Network every Sunday afternoon at 3:30-4:00, E.S.T., beginning Jan. 2. Radio that's delightfully different.

You have this reassurance, too. ZINCGRIP sheets are an Armco product, carefully developed and thoroughly tested in the field as well as in the research laboratory. Even now, many articles are being successfully made of it. Manufacturers are saving production dollars and achieving better, more durable products of all kinds.

Write for complete information, telling us, if you will, about any application you have in mind. The American Rolling Mill Company, Executive Offices: 2560 Curtis Street, Middletown, Ohio. District Offices in All Key Cities.

ARMCO ARMCO **ZINCGRIP SHEETS**

The part we can't show in our catalogue

You who know machinery expect modern design and fine materials in a Warner & Swasey Turret Lathe. We scarcely need mention them. But there is something far more important—something difficult to describe—that only those who have used Warner & Swaseys can evaluate. That is the *character* built into these machines; a character that pays big dividends to the turret lathe user.

For 57 years we have believed that our customer has the right to more profit out of our machine than we have. We believe you must be entirely satisfied with your purchase—not only while the machine is new but for years. We believe that unless our product fills an actual need in your plant, you should not buy it.

These ideals do pay dividends to the user, in years of trouble-free, profitable operation, little or no upkeep, less down-time and scrap loss, greater output, greater accuracy, less effort for operators. *These* are the dividends of character in a turret lathe.

WARNER & SWASEY
Turret Lathes
Cleveland

U CAN TURN IT BETTER, FASTER, FOR LESS—WITH A WARNER & SWASE

VANCORAM FERRO-ALLOYS

FERRO-VANADIUM
Open Hearth, Electric and Crucible Grades

FERRO-SILICON
15%, 50%, 75%, 80-90%, 90-95%

FERRO-TITANIUM
High, Medium and Low Carbon Grades

FERRO-CHROMIUM
High Carbon Grade (4 to 6% carbon). Low Carbon Grades (from maximum .06% carbon to maximum 2% carbon). Special Iron Foundry Grade

ALSIFER
The Ferro-Silicon-Aluminum Deoxidizer Without a Disadvantage.

CHROMIUM METAL

•

These grades of Vancoram Brand Ferro-Chromium are carried in stock and supplied as required in large lumps, or crushed or ground to various sizes. Write for complete information.

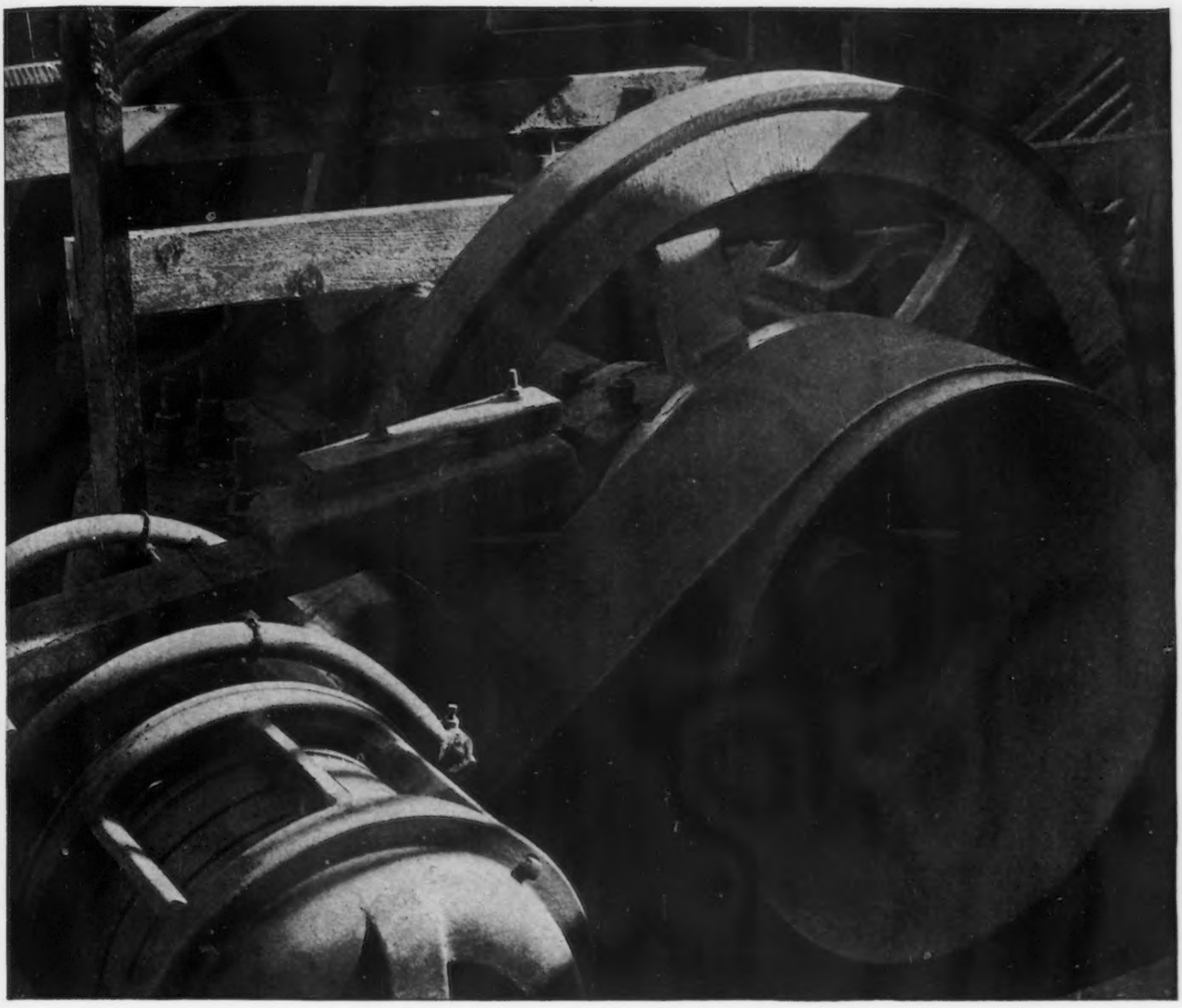
•

VANADIUM CORPORATION OF AMERICA
420 LEXINGTON AVENUE, NEW YORK, N. Y
Plants at Bridgeville, Pa., and Niagara Falls, N Y.
Research and Development Laboratories, Bridgeville, Pa.

METALS VANCORAM ALLOYS

VANADIUM STEELS

FOR STRENGTH • TOUGHNESS • DURABILITY



Plylock Splice Makes Your Job Easier, Your Work More Efficient and Safe

Keeps belts running longer, reduces time and money loss of belt repairs, removes all danger of fastener accidents, offer many other advantages

NO ONE needs to tell you how endless transmission belts save time and money, increase plant efficiency, end danger from flying broken fasteners. All these advantages can easily be yours with Highflex Belts made endless by the patented Plylock Splice.

Don't confuse Plylock with splices you have known—splices that failed at the seams. The Plylock Splice, developed by Goodrich research, lasts as long as the belt because the outer plies are carried down and under the edge, locked in place, and permanently protected from all wear and windage.

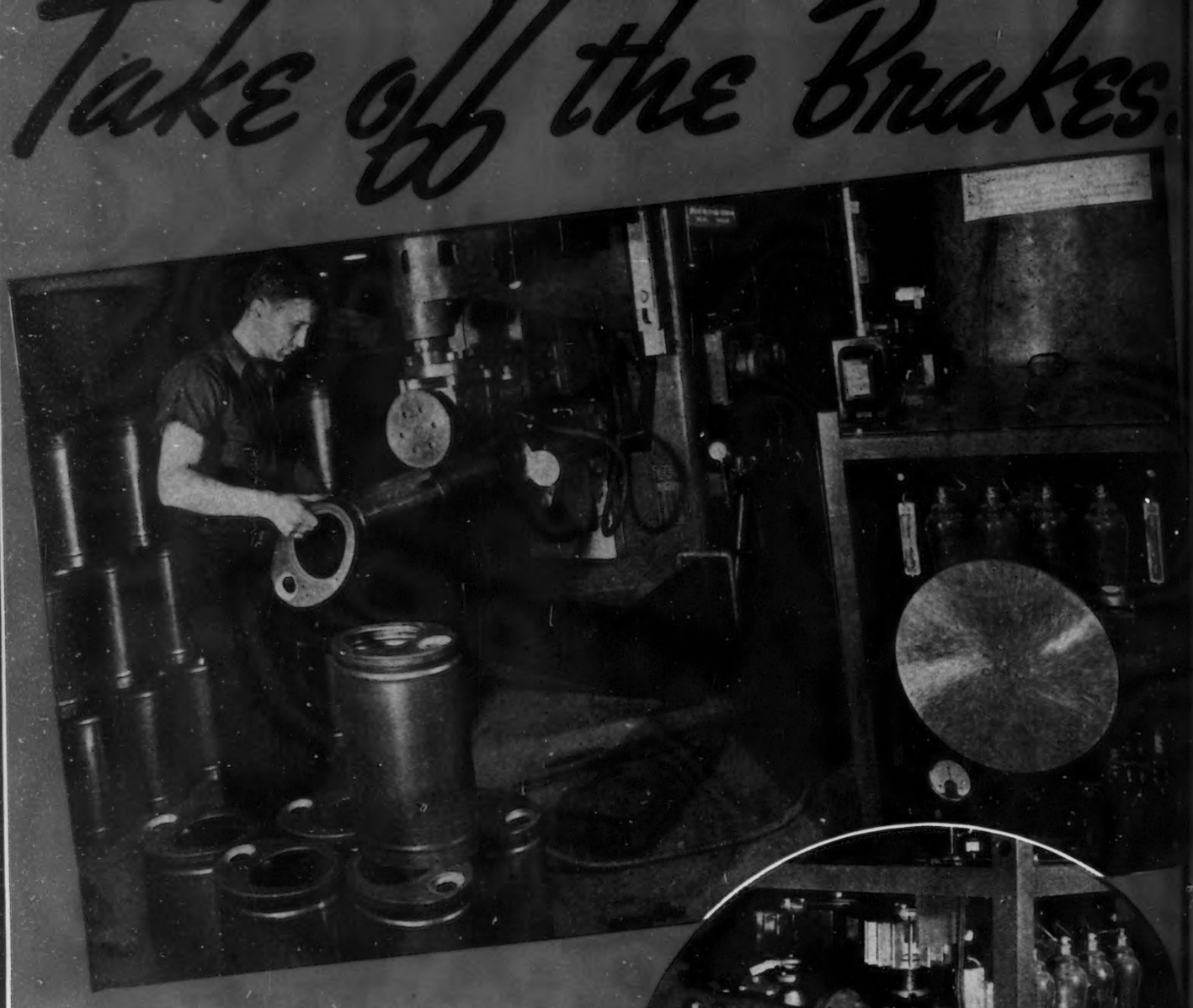
Highflex Belts have been famous for years for their longer life—assured by special compounds to resist age and oxidation, more uniform stretch and pressure during cure, better surface treatment to give firmer pulley grip. Now these belts are an even greater value because they can be made endless by the Plylock Splice, in a few hours, on your drives or in the shop of your nearby Goodrich Distributor.

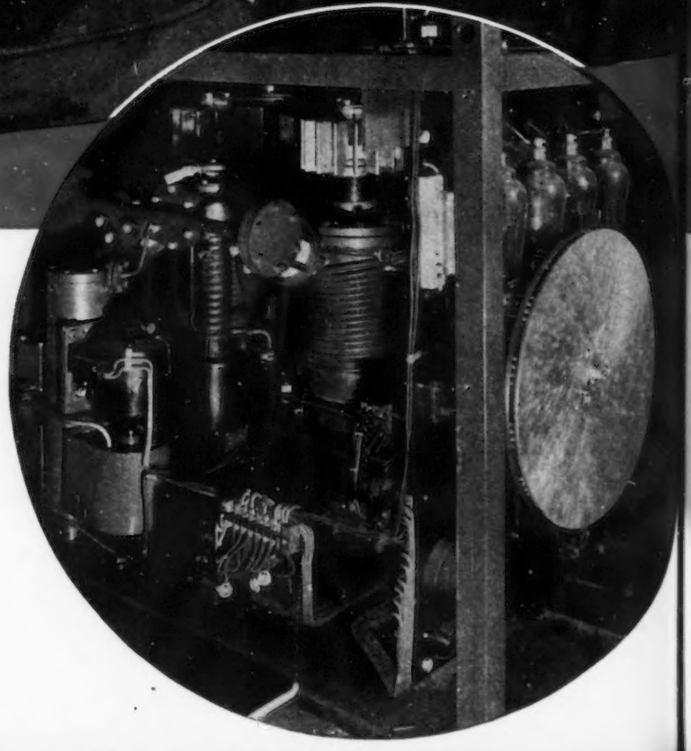
These Goodrich endless belts are setting new records for long life, low cost, freedom from trouble in hundreds of plants. Let your Goodrich Distributor show you how easily you, too, can cut your costs and delays with Highflex and Plylock. Next time you buy belts, specify Goodrich and you will save money. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich

ALL *products problems* IN RUBBER

Take off the Brakes.





Seam welding in plant of Stewart-Warner Corporation, Chicago, at rate of approximately 72 inches per minute with seam welder, equipped with Westinghouse Ignitron Welding Control, as illustrated at right. Welder is timed two cycles on, two cycles off. Power through the controls is approximately 200 k.v.a.

(*Right*) Ignitron Timer Control shown with cabinet doors removed. No mechanical contacts affect the timing in any way, assuring maximum accuracy, long life and low maintenance costs.

W WESTINGHOUSE ELECTRIC

Westinghouse

Speed up Production

with Westinghouse

IGNITRON SPLIT-SECOND CONTROL

Split-second accuracy in weld timing with Westinghouse Ignitron Controls puts resistance welding on a production basis. Output can be increased and uniformly high quality maintained. These results can be obtained by the addition of Westinghouse Ignitron Controls to resistance welding equipment—specify Westinghouse Ignitron Control when purchasing new welders—add it to your present welding equipment. Many metals and products formerly fabricated by more expensive methods now can be resistance-welded with complete success.

The remarkable performance of welding machines equipped with Westinghouse Ignitron Timers results from electronic regulation of welding time and current within infinitely narrow limits, not possible by mechanical means. Such accurate control of timing and current not only speeds up production but also reduces discoloration, burning, warping and other faults resulting from inadequate control.

If you want to speed up production and lower your costs, investigate Ignitron Welding Controls for resistance welding. Ask your Westinghouse representative for complete information or write Westinghouse Electric, East Pittsburgh, Pa.

J 20454

DO YOU USE RESISTANCE WELDING *for*

ALLOYS ● ALUMINUM ● BRASS ● COPPER ● NICKEL ● STEEL ● STAINLESS ● TUNGSTEN

or combination welding of these metals? If so, it will pay you to investigate Ignitron Welding Controls. Write today for complete information. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Ignitron WELDING CONTROLS

Another advantage of Rolled Steel Design..

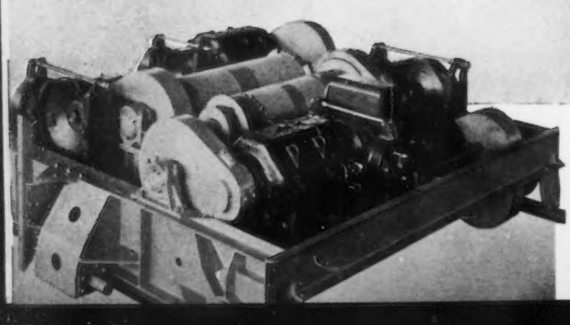
YOU PICK YOUR STEEL

USS Stainless Steel (18-8 Stabilized) is often the best choice for welded chemical machinery like this power agitated autoclave, because it will last indefinitely and will not contaminate most corrosive products. This special modification of USS Stainless Steel can be cut, fabricated and welded with no loss in its corrosion-resistance.

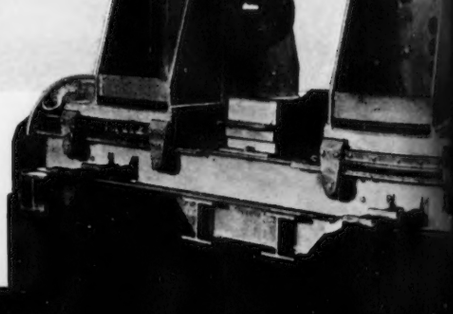
In construction like this concrete mixing drum USS Abrasion-Resisting Steel withstands the constant pound and grind, reduces breakage, ensures long life. A difficult unit to build unless you use rolled steel and welded construction.

30 CUBIC YARDS AT ONE GULP! *USS* MAN-TEN *all welded rolled steel construction gives this heavy duty dipper the strength and abrasion resistance to keep it on the job in this grueling service. The thousands of pounds of weight* MAN-TEN *construction saves can be converted into increased dipper capacity making it possible for the shovel to do more work with no increase in power.*

(Right) *Welded Rolled Steel and steel castings are combined in this cone-type uncoiler for tin plate mill to realize the most efficient and economical construction. Correct design and the proper selection of materials make this unit strong, rigid, free from vibration, eminently practical from every point of view.*



(Left) *USS* MAN-TEN *rolled steel construction gives this trolley the safety that crane equipment demands. With tensile strength of 85,000 lb. per. sq. in. min. and yield point of 55,000 lb. per. sq. in. min.* MAN-TEN *permits weight reduction far below conventional construction, without any sacrifice of strength or lasting qualities.*



TO FIT YOUR JOB

from an amazing variety of "staple" and "special" steels

ROLLED steel design—the technique of building up heavy machine beds, frames, supports, housings, wheels, drums, etc. by welding together component parts of rolled steel cut-to-shape—offers many important advantages:—

Rolled steel is highly uniform; it reduces the possibility of failure in service due to blow holes, segregation and non-uniform structure.

Rolled steel's physical properties are readily determined from the actual section being used and the properties are very uniform throughout the metal.

Rolled steel is free from brittleness, possesses excellent fatigue properties.

Rolled steel design eliminates the costly pattern problem, the shrinkage problem, and the necessity of adapting designs for pattern draw and metal flow.

Rolled steel design trims off all parasite poundage, all metal not actually needed to carry stresses or provide rigidity. It often reduces dead weight by half and more.

Rolled steel design looks modern and is modern, eliminates useless ornamentation, employs straight lines and plane surfaces. It increases eye appeal and saleability.

Rolled steel permits machine design to be mobile and liquid; makes possible the quick incorporation of style changes, model changes and new improvements without costly pattern write-offs.

In general, rolled steel design (economically combined with castings at strategic points) is the cheapest, strongest, safest, most attractive method of machine construction.

IN ADDITION — and this is perhaps its most important advantage — *rolled steel design enables you to make use of a great variety of special shapes and special steels.*

Various products such as billets, slabs, bars, pipe, tubing, forgings, rolled sections, etc. simplify the cost and difficulties of fabrication.

Special steels provide special properties where you need them to overcome various destructive forces. Higher hardening steels to carry heavier bearing pressures. Fatigue-resisting steels. Heat-resisting steels. Abrasion-resisting steels. High tensile steels for high unit stresses. Stainless steels for corrosion resistance. A special steel with special properties for virtually every special need.

To machine designers, fabricators, foundries, and welderies . . . we offer the widest range of special steels. Grade for grade, they are the finest steels it is now possible to make.

SPECIAL STEELS WITH SPECIAL PROPERTIES

to overcome destructive forces

Here is just a sample of the variety of special steels we offer — special steels to make your designs stronger or harder or abrasion-resistant or heat-resistant or fatigue-resistant or corrosion-resistant or whatever-you-need.

USS High Tensile Steels
- **USS COR-TEN**
- **USS MAN-TEN**
- **USS SIL-TEN**

USS Steel for Low Temperature Service

USS Abrasion-Resisting Steel

USS 11/14% Manganese Steel

USS Stainless Steels

USS Carilloy Alloy Steels

OPPORTUNITY

Perhaps the greatest opportunity to improve present heavy machinery lies in the skillful combination of rolled steel and castings . . . and the specification, for each rolled steel part, of the precise steel most suitable to overcome the destructive forces to which that part will be subject in service.

For example, it will often be advantageous to combine in one unit a section of USS A-R Steel to resist abrasion at a certain point, with USS High Tensile Steels to provide strength and save weight, and with a grade of USS Carilloy to carry heavy bearing stresses.

CARNEGIE-ILLINOIS STEEL CORPORATION *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON and RAILROAD COMPANY, *Birmingham*
United States Steel Products Company, New York, *Export Distributors*

USS

UNITED STATES STEEL

A Question You Can't Afford To Have a Customer Ask You

"Why not make it of *STEEL?*," we asked the construction industry . . . And scores of firms were led to find new sales appeal in the permanence, beauty and safety of this superior building material.

"Why not make it of *STEEL?*," we challenged container producers . . . And scores of firms found that this versatile material enabled them to revolutionize accepted distribution methods.

"Why not make it of *STEEL?*," we repeat for the profit of all industry . . . And in renewing that query we continue to offer you steel with a latitude in size and analysis that has helped many manufacturers solve difficult production problems.

With today's accelerated consumer preference for steel, you cannot afford to lag while your customers keep pace with the constantly expanding list of new steel uses. Why not investigate what Great Lakes Steel can do for *you*? Why not make it of STEEL?

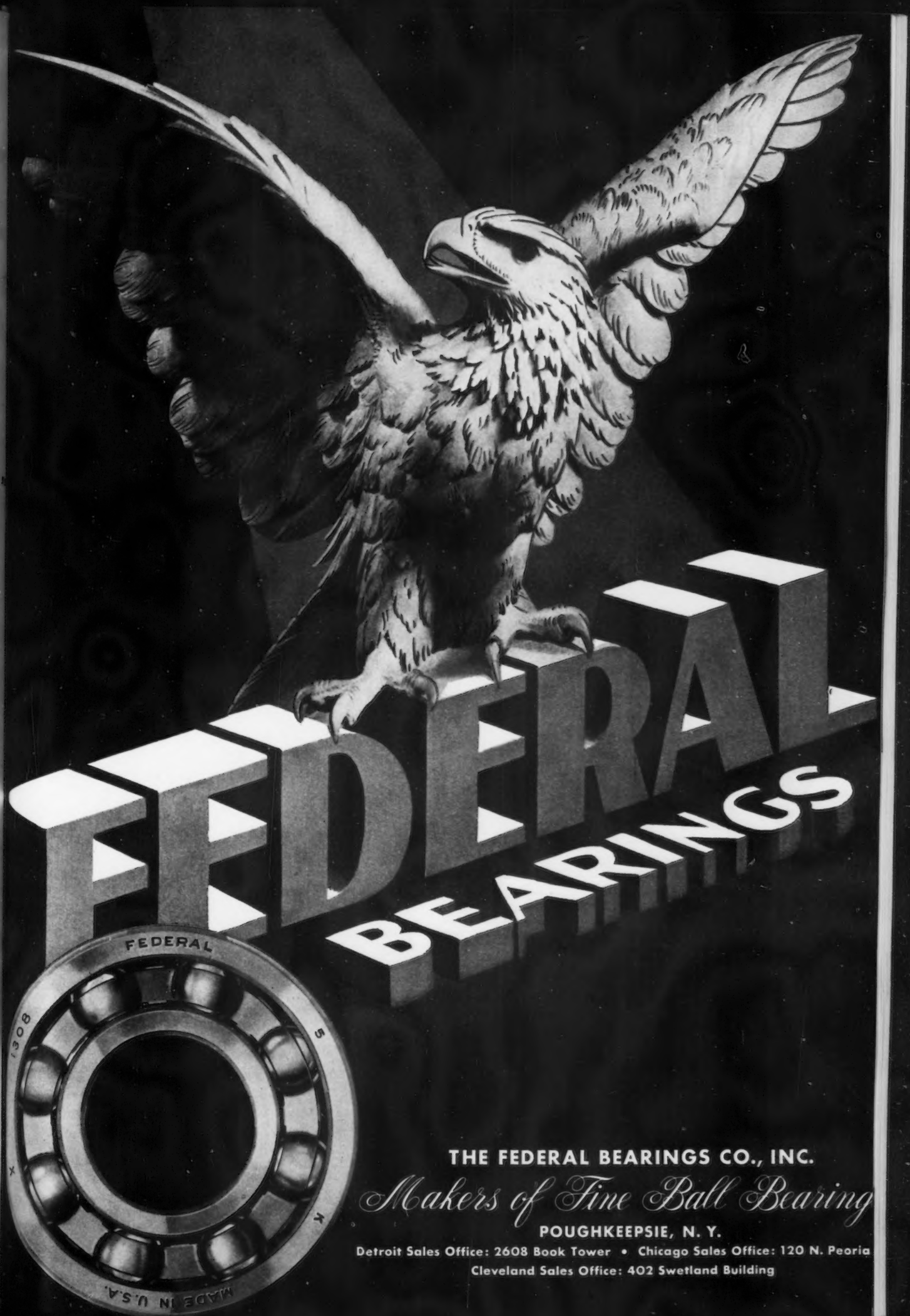
NATIONAL STEEL

GREAT LAKES STEEL CORPORATION, DETROIT, MICH.

DISTRICT OFFICES: *Boston*, 1001 Statler Bldg.; *Chattanooga*, Hamilton Bank Bldg.; *Chicago*, 1026 Builders Bldg.; *Cleveland*, 820 Leader Bldg.; *Dayton*, 846 Third National Bank Bldg.; *Indianapolis*, 1215 Circle Tower; *New York*, 500 Fifth Ave. Bldg.; *Philadelphia*, 605 Liberty Trust Bldg.; *St. Louis*, E. R. Hensel Co., Cotton Belt Bldg.; *San Francisco*, Sharon Bldg.; *Toronto, Ontario*, General Assurance Bldg.

UNIT OF

NATIONAL STEEL CORPORATION



THE FEDERAL BEARINGS CO., INC.

Makers of Fine Ball Bearing

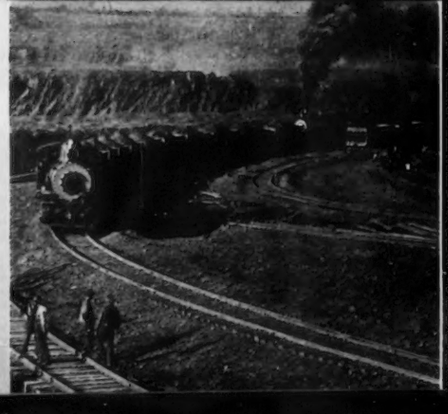
POUGHKEEPSIE, N. Y.

Detroit Sales Office: 2608 Book Tower • Chicago Sales Office: 120 N. Peoria
Cleveland Sales Office: 402 Swetland Building

We are equipped to furnish Amercut Cold Finished Steel Bars in any size rounds from 1/32" diameter up to and including 6". We also produce a wide range of sizes and shapes of bars to supply every need. We suggest that you consult our Sales Department or Service Engineers for requirements that are other than standard.

ROM MINE . . . TO MILL . . . TO MACHINE

portant to the manufacturer is the
t that Amercut Cold Finished Steel
rs are produced through our own
ilities from mine to mill to machine.
ey pass through a unified system of
ection, investigation, and absolute
oratory control. Each step is im-
tant in the quality of the finished
duct . . . we handle them all.



You get them All!

WHEN you use Cold Finished Steel Bars in producing machined parts, you get all of these money saving advantages. Parts machined from Cold Finished Steel Bars can be made with great accuracy with a minimum of machining operations, and when completed have that smooth, shining finish which otherwise can be obtained only with additional work.

Amercut Cold Finished Steel Bars will give you the quality and uniformity characteristic of products manufactured by the American Steel & Wire Company. The cold drawing operation employed in making these bars improves the physical properties of the steel and gives it a smooth finish and accurate size. For this reason there is no need for turning down the bar to remove surface imperfections, and considerable savings can be made in scrap and turnings as well as in time. For more than half a century these bars have been producing the finest results wherever they have been used.

Amercut Cold Finished Steel Bars are kind to your tools. Uniformity and freedom from imperfections not only improve their machinability but lengthen tool life.

Amercut Cold Finished Steel Bars are available in any type or grade you need and can be produced in the exact analysis and finish you require. We will be glad to furnish you with technical assistance at any time.

U·S·S AMERCUT
COLD FINISHED STEEL BARS

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

New Industrial Literature

A REVIEW OF CURRENT CATALOGS AND CIRCULARS • A TIME SAVING SERVICE FOR BUYERS

Order by number literature wanted. No Cost. No Obligation. Address The Iron Age, 239 West 39th St., New York City *

MATERIALS HANDLING EQUIPMENT.—Service Caster & Truck Co. An unusually complete catalog covering all types of castings, hand trucks, lift trucks and trailers. Detailed specifications as well as list prices on all types and models are included. Bulletin 12-142.

ARC WELDING EQUIPMENT. — Hobart Bros. Co. Catalog describing the new 40 volt simplified arc welder featuring motor horsepower control. Photographs illustrate construction features and show typical "build your own" portable welders. Bulletin 12-143.

CENTRIFUGAL PUMPS. — Pennsylvania Pump & Compressor Co. Bulletin describing thrustfree multi-stage centrifugal pumps featuring the Pennsylvania principle of effecting non-leakage dynamic hydraulic balance. This feature is said to add greatly to the life of the pump and permit a simpler design. Bulletin 12-144.

COMBUSTIBLE GAS TESTER.—Mine Safety Appliances Co. Bulletin describing the M.S.A. Explosimeter, a pocket-sized instrument for quickly and easily determining the presence of combustible gas hazards. Bulletin 12-145.

STAINLESS STEELS. — American Rolling Mill Co. Booklet describing Armco stainless steels of the chromium-nickel type. Typical analyses and physical properties of various grades are given, and typical applications are illustrated. Bulletin 12-146.

FLOOR PLATE.—American Pressed Steel Co. Leaflet describing Neverslip diamond pattern floor plate. The pattern design is claimed to permit easy drainage and cleaning and to provide nonslip traction from every direction. Bulletin 12-147.

INDUSTRIAL LUBRICATION.—Lincoln Engineering Co. Twenty-seven page catalog illustrating and describing line of lubricating equipment for industrial service. Illustrations and sizes of fittings are included. Bulletin 12-148.

WIRE ROPE.—A. Leschen & Sons Rope Co. Twenty-six page booklet containing discussion of features and construction of Hercules wire rope. Various styles with size, technical data and list prices are included. Bulletin 12-149.

FORGINGS.—Ampco Metal, Inc. Folder discussing the use of Ampco metal for forgings. Discusses impact resistance, hydraulic units and forging practice. Bulletin 12-150.

PORTABLE ELECTRIC TOOLS. — Wodack Electric Tool Corp. Booklet form catalog covering drills, hammers, grinders, buffers, groovers, drill stands and radio arms. Illustrated and includes descriptive text and prices. Bulletin 12-151.

SELF-LUBRICATING BEARINGS.—Boundbrook Oil-Less Bearing Co. Binder containing data on Compo porous bronze oil-retaining bearings. Information on structure, methods of installing and typical installations included. Bulletin 12-152.

INDUSTRIAL VACUUM CLEANERS.—Breuer Electric Mfg. Co. Bulletin describes a small ball bearing equipped vacuum cleaner. Machine is light in weight and portable and was designed primarily for maintenance cleaning in industrial plants. Bulletin 12-153.

MARINE BATTERIES.—USL Battery Corp. Folder describing the design and operating characteristics of USL marine batteries. Patented sectional plate construction is said to eliminate plate failures due to expansion and contraction stresses. Bulletin 12-154.

POWER PUMPS.—Aldrich Pump Co. Data sheet No. 59 containing descriptions and data on power pumps, centrifugal pumps and hydraulic machinery. Machines may be equipped for chain, gear or V-belt drive and are available in working pressures up to 9600 lb. Bulletin 12-155.

CORRUGATED CULVERTS.—Armco Culvert Manufacturers Association. New pamphlet traces the history of corrugated metal drainage pipe from the time it was invented to the present day. Also described are asbestos bonded pipe and paved invert pipe. Bulletin 12-156.

VANADIUM CAST IRON. — Vanadium Corp. of America. Booklet describes the growth and use of vanadium alloy cast iron. In addition to a detailed description of the effects of vanadium additions to cast iron, the publication gives complete data on the physical properties of such alloy irons. Numerous photographs are used to illustrate typical applications. Bulletin 12-157.

CORE PLATES AND PALLETS. — Johns-Manville Co. New booklet for foundrymen on Transite core plates and pallets containing information on the characteristics of this material. Transite is said to be light in weight, possess low heat transmission and resists corrosion. Photographs illustrate typical applications. Bulletin 12-158.

INDUSTRIAL LUBRICATION. — E. F. Houghton & Co. Booklet containing a discussion of the problems faced in lubricating industrial machines and the manner in which Sta-Put lubricants have been developed to meet these problems. Bulletin 12-159.

HEAT TREATING FURNACES.—American Gas Furnace Co. Bulletin describes and illustrates various types of gas fired furnaces for heat treating processes. Also included are illustrations and descriptive text covering gas blow pipes and various types of furnaces. Bulletin 12-160.

SPRAY GUNS.—Binks Mfg. Co. Folder covering new model Thor spray gun. Complete instructions are given for the operation and maintenance of this gun, and methods for avoiding spitting and pattern distortion of the spray are treated in detail. Bulletin 12-161.

INFLUENCE OF MACHINES ON AMERICAN LIVING STANDARDS. — National Machine Tool Builders' Association. Booklet titled "Life, Liberty and the Pursuit of Happiness" which dramatically portrays the vast influence of machines on the American standards of living. Photographs compare conditions of yesterday and today. Bulletin 12-162.

* IF YOU WANT YOUR NEW CATALOG OR LITERATURE LISTED HERE SEND A COPY TO ABOVE ADDRESS

You Can Move Anything FARTHER On A Dollar

When the Pay Load Is Increased *BY INLAND HI-STEEL*

● Inland Hi-Steel was developed for the equipment manufacturer who wants to make *mobility* and *low operating costs* important sales features of his product.

With Inland Hi-Steel he can greatly reduce structural weight without loss of strength . . . and this open hearth alloy also has much greater resistance to atmospheric corrosion even than copper bearing steel.

These advantages can now be added to his product at very small cost, for his tonnage consumption of steel is reduced and his fabrication costs are not materially increased.

Daily savings in operating costs reach big totals for the user.

Not only does Inland Hi-Steel make the equipment more *mobile* and *profitable* in his hands, but it also makes sales move faster for the manufacturer who anticipates these customer-advantages and builds from an operating viewpoint with Inland Hi-Steel.

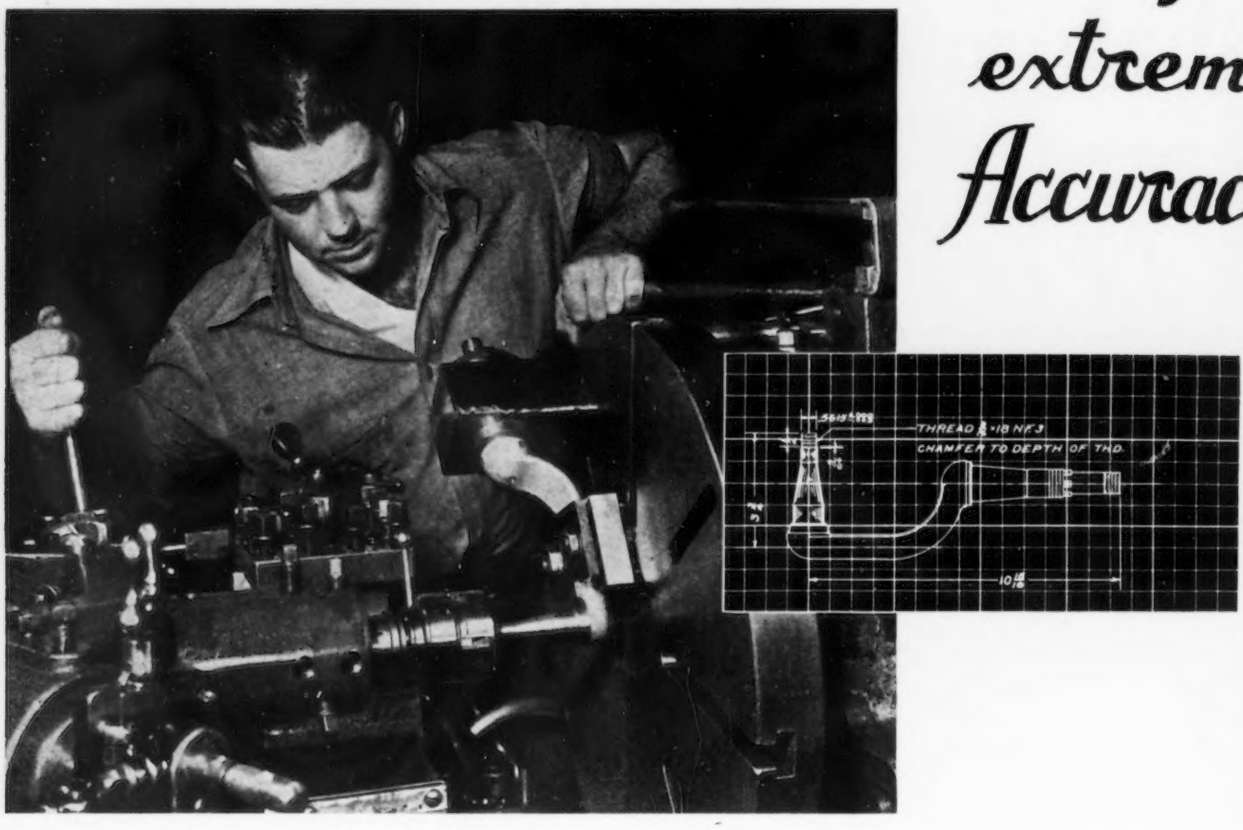
Send for Bulletin No. 10 which fully describes Inland's low alloy, high strength Product

SHEETS STRIP TIN PLATE BARS RAILS TRACK ACCESSORIES PLATES FLOOR PLATES STRUCTURALS PILING REINFORCING BARS

INLAND STEEL CO.

General Offices: 38 South Dearborn Street, Chicago, Illinois • Offices in: Detroit-Kansas City-Milwaukee-St. Louis-St. Paul

its LANDMATIC *Die Heads for extreme Accuracy*

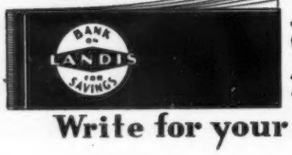


The Boeing Airplane Company are as careful in their machining operations as they are in the selection of materials to be used in their all-metal, twin-engined planes. Above everything else, they demand *accuracy*. A typical example of this accuracy is in the threading of Tail Wheel Knuckles. Accurately, well-finished threads with absolutely no taper are required and a 100% inspection guarantees that only the perfect threads pass.

A 5/8" LANDMATIC is used to cut the 9/16" diameter, 18 pitch thread on 4130 SAE steel with a Brinnel hardness of 186 to 256 and every thread passes inspection. Incidentally, a reduction of 50% in threading time was made as other methods required two cuts whereas the LANDMATIC requires only one cut to produce the thread.

Write us for more information on LANDMATIC Heads.

LANDIS CHECK ✓ BOOK



. . . are you handling your threading jobs efficiently?

. . . . . The Check Book will tell you!

Write for your copy today

LANDIS MACHINE COMPANY, Inc.

Waynesboro, Penna.

. . . . CHICAGO . . . .

. . . District operations off slightly to 22% of capacity.

o o o

. . . Railroad buying and replenishment of inventories expected.

o o o

. . . Farm implement and tractor manufacturers best buyers.

CHICAGO, Dec. 28. — A decrease in operations at one mill brought down the district rate one and a half points to 22 per cent of capacity, despite a slight increase at another plant and a continuance of last week's rate at the other mills here. Blast furnace activity is unchanged, 14 furnaces operating.

Steel sellers are clinging to the hope that railroad buying will bolster their slim mill schedules, and some anticipate that cars and rails will be placed within a few weeks. The Chesapeake & Ohio is inquiring for 27,500 tons of rails and the Pere Marquette, 6700 tons, to be divided evenly between that road's American and Canadian lines. About one-ninth of the Canadian National's $9,000,000 equipment inquiry is expected to be placed in this country.

Sales and specifications at one mill here the past week were not quite up to those reported for the previous seven-day period but were in excess of any of the preceding four weeks. Farm implement and tractor manufacturers remain the most reliable consumers but even their specifications are considerably less than was being ordered only a short time ago. One seller reports splendid merchant pipe business, which is unusual at this time of year.

Broken inventories are affording salesmen the prospect of increased general buying in January. Buying last week was only to fill in stocks. This policy undoubtedly will continue for a few weeks into 1938.

The price of heavy melting steel scrap remains at $12.50 to $13 a gross ton, delivered.

Structural Shapes

The largest pending project is the Mississippi River dam at Clarksville, Mo., which will require at least 4000 to 5000 tons. Plans are expected next month and bids in February. With the completion of this dam, the Government's Mississippi construction plan will have been finished.

Pig Iron

December shipments of iron were down about 50 per cent, while foundry coke shipments were off 18 per cent compared with November. Several district foundries have closed down during the holidays not to resume operations until Jan. 3 for some and Jan. 10 for others.

Wire and Wire Products

Low inventories at the close of the year are providing sellers with encouraging prospects for buying next month. It is believed that farm buying will increase in volume about the middle of January, orders from the rural areas being received at present only irregularly.

Warehouse Business

Jobber activity remains under the holiday influence and little business of importance is expected before the middle of next month, when inventory periods are usually completed and restocking begins.

Reinforcing Bars

Activity in this market is confined almost entirely to small jobs. Schools in Milwaukee and Joliet, Ill., netted Joseph T. Ryerson & Son, Inc., 700 tons, while Calumet Steel Co. was awarded a school at Niles Center, Ill., and a tonnage for Chicago airport construction. The only pending job of size is a Mississippi river dam at Clarksville, Mo., bids on which will probably be taken in February.

Plates and Sheets

With railroad buying still negligible and automobile demand insignificant, these markets are exhibiting little strength. Deliveries range from prompt to three weeks. Tank makers have some work, but their plate requirements are not large. Farm equipment specifications are being received from time to time, but not in so great a volume as a month or two ago.

REINFORCING STEEL

. . . Awards of 3820 tons —5800 tons in new projects.

AWARDS

Cincinnati, 400 tons, Columbia Avenue viaduct, to Truscon Steel Co., Youngstown, Ohio.

Cincinnati, 100 tons, Hennegan Co. building, to Pollak Steel Co., Cincinnati.

Neville Island, Pa., 325 tons, Kelsey-Hayes Wheel Co. manufacturing building, to Jones & Laughlin Steel Corp., Pittsburgh.

Washington, 120 tons, men's dormitory, Howard University, to Bethlehem Steel Co., Bethlehem, Pa.

Bay City, Mich., 180 tons, Lafayette Avenue bridge, to Truscon Steel Co., Youngstown.

Niles Center, Ill., 245 tons, school, to Calumet Steel Co., Chicago.

Joliet, Ill., 100 tons, school, to Joseph T. Ryerson & Son, Inc., Chicago.

Chicago, 100 tons, airport construction, to Calumet Steel Co., Chicago.

Milwaukee, 600 tons, Pulaski High School, to Joseph T. Ryerson & Son, Inc., Chicago.

Des Moines, Iowa, 650 tons, sewage disposal plant, to Laclede Steel Co., St. Louis.

St. Louis, 250 tons, Socony Vacuum Oil Co. building, to Laclede Steel Co., St. Louis.

Wichita, Kan., 250 tons, bridge, to Sheffield Steel Corp., Kansas City.

Mare Island, Cal., 500 tons, dry dock, to Bethlehem Steel Co.; Pacific Bridge Co., San Francisco, general contractor.

NEW REINFORCING BAR PROJECTS

Queens, N. Y., 135 tons, New York State exhibit building, World's Fair.

Lynbrook, N. Y., 1400 tons, grade crossing elimination, Long Island Railroad Co.

New York, 140 tons, roadways and underpass, Madison Avenue bridge in Bronx.

New York, 375 tons, roadways and bridge, New York Central Railroad at East 140 Street and Grand Concourse.

Syracuse, N. Y., 100 tons, Onondaga Valley Academy; bids taken Dec. 27.

Elkhart County, Ind., 100 tons, bridge.

Chicago, 150 tons, Loyola University chapel.

Clarksville, Mo., Mississippi River dam, unstated tonnage; bids in February.

Los Angeles, 4195 tons, for U. S. Engineer (Proposal 171); Soule Steel Co., Los Angeles, low bidder on total f.o.b. job site; Laclede Steel Co., St. Louis, low bidder f.o.b. mill on certain unit bids.

Los Angeles, 135 tons, Fox studios bridge for Board of Public Works; general contract to John Strona, Chino, Cal.

Berkeley, Cal., 104 tons, Whittier School; Villadsen Bros., Inc., Oakland, Cal., low bidders on general contract.

Santa Monica, Cal., 100 tons, Corral, Solstice, and Escondido Creek bridges; bids Jan. 13.

Odair, Wash., 1680 tons for Bureau of Reclamation; bids opened.

Chafee County, Colo., 134 tons, State highway project; bids opened.

Knob, Cal., 1040 tons, All-American Canal; bids Jan. 4.

Honolulu, T. H., 150 tons, harbor oil line.

Honolulu, T. H., 160 tons, Territorial building; bids Dec. 30.

NRA Adviser Suggests Solution For Basing Points Controversy

IN an address delivered before the Association of American Law Schools at the Stevens Hotel, Chicago, Wednesday evening, Dec. 29, Malcolm P. Sharp, associate professor of law of the University of Chicago, who was special adviser on the steel code under the National Recovery Administration, advocated a combination of the Wheeler anti-basing point bill and the Robinson-Patman Act as the best means of settling the controversy over the use of basing points in steel and other industries.

"The position which the Federal Trade Commission tends to take," said Professor Sharp, "in favor of 'uniform mill net yield' and against differentials between the home folks and the 'foreigner' is academic and impractical in its simple forms."

Referring to the Wheeler bill, Professor Sharp said that "such a scheme of legislation must allow producers considerable latitude of freight absorption so that they may continue to have a means of meeting competition. The Robinson-Patman Act, permitting this allowance 'in good faith to meet an equally low price of a competitor' permits such differentiation.

"But in order that a nearby buyer cannot take advantage, through diversion, of the lower f.o.b. price of shipments originally ordered for a distant point, and thus unfairly obtain the benefit of the price differential, agreements between producers and carriers with respect to diversions are essential." The seller, Professor Sharp suggested, could retain "security title" by taking bills of lading running to his own order. He added that "such safeguards should not only be permissible under the scheme of legislation but should be expressly provided for."

To avoid the possibility of sudden dislocation of the price structure, Professor Sharp said, the legislation should permit time for gradual adjustment.

PERSONALS

(CONTINUED FROM PAGE 61)

J. A. VOELKER has been appointed district sales manager New York office of Pittsburgh Steel Co. Some years ago he was salesman for the New York office of the Pittsburgh Steel Products Co., which was later taken in by Pittsburgh Steel Co. Since this change Mr. Voelker has been in charge of seamless tube sales in the New York office territory and for export. His new duties will include steel and wire products as well as seamless tubes.

❖ ❖ ❖

L. A. MULLEN has been appointed assistant district sales manager New York office Pittsburgh Steel Co. Previous to joining Pittsburgh Steel Mr. Mullen was associated with Republic Steel Corp. in sales capacities since 1928, having been successively at the company's Youngstown, St. Louis, Kansas City and Milwaukee offices.

❖ ❖ ❖

W. F. BOORE has been appointed sales agent New York office Pittsburgh Steel Co. He entered the employ of the company in the sales department in 1926, and prior to his recent transfer to New York worked in the company's Pittsburgh office.

HENRY A. ROEMER, JR., has been made sales manager of the newly established Pittsburgh District Office, Pittsburgh Steel Co. Mr. Roemer has been district sales manager of the company's Charlotte, N. C., office since 1936. The Charlotte territory has been added to the Pittsburgh office territory.

❖ ❖ ❖

DAVID F. MANN has been made assistant district sales manager Pittsburgh district. He has been connected with the sales department s ince 1913, having worked as Chicago district sales manager from 1923 to 1935, and since 1935 as New York district sales manager.

❖ ❖ ❖

NATHAN R. BIRGE, assistant to the president of the General Electric Co. since 1927, has been elected a vice-president of the company. He entered the employ of General Electric in 1900, following his graduation from Worcester Polytechnic Institute. In 1902 he was transferred to the former supply department of the company and was later made manager of the street lighting section. He was named assistant manager of the supply department in 1923 and in November of that year was transferred to the executive department.

❖ ❖ ❖

FRANK A. TROXEL, formerly chief engineer, Aliquippa works, Jones & Laughlin Steel Corp., Pittsburgh, has joined the staff of the Richard Thomas Steel Co., Ltd., Wales. His position will be chief engineer of the company's new hot and cold strip mill plant at Ebbw Vale, Wales, which is now under construction. Mr. Troxel will sail for Wales on Jan. 4.

Great Lakes Plant Making No Steel This Week

DETROIT, Dec. 28.—Great Lake Steel Corp., Ecorse, Mich., has cut out the remainder of its open hearths and all 12 are now idle. The company had resisted the downward swing until the middle of November, operating its 12 open hearth furnaces until that time in building a backlog of slabs. This retrenchment in the last six weeks is unique for this company since the depression low was approximately 50 per cent. The almost complete absence of orders from the automobile and affiliated industries is responsible for the current decline. Ford Motor Co., the only other open-hearth operator in the area, is currently operating seven furnaces.

. . . CLEVELAND . . .

. . . Steel-making capacity almost idle this week.

o o o

. . . Incoming business drops further owing to holidays.

o o o

. . . C. & O. and Pere Marquette to buy rails.

CLEVELAND, Dec. 28.—Some steel plants that shut down for the Christmas holiday will remain idle this week, deferring resumption until after New Year's, and others have started up at a reduced rate. This reduction in operations has brought the Cleveland rate of production down 13 points to 14 per cent of capacity and the rate in the Youngstown district two points to 15 per cent of capacity.

Incoming business has declined further owing to the holidays. Virtually all recent orders have been for shipment after the turn of the year. From all present indications activity will be strengthened in January, principally through the need for replacements to depleted consumers' stocks.

The Chesapeake & Ohio's 27,500 tons of 131-lb. rails are expected to be awarded to Carnegie-Illinois Steel Corp., Inland Steel Co. and Bethlehem Steel Co. Approximately 8000 tons of fastenings will be required. The Pere Marquette Railroad is inquiring for 6700 tons of rails.

Inquiries for steel water pipe from northern Ohio cities are expected in the next few weeks and are estimated to total around 5000 tons. Cleveland will take bids on 9000 feet of 36-in. steel pipe on Jan. 14.

In line with the better feeling throughout the scrap industry generally, No. 1 heavy melting steel scrap is up 50c. to $12.50 to $13 a ton.

Iron Ore

Ore on hand at furnaces Dec. 1 totaled 36,552,692 tons and Lake Erie dock stocks totaled 6,073,262 tons, making the total of ore Dec. 1 at furnaces and Lake Erie docks 42,625,954 tons, according to the report of the Lake Superior Iron Ore Association. This total compares with 35,378,068 tons on hand and at furnaces and docks Dec. 1, 1936. Furnaces in blast on the last day of November totaled 90, a decrease of 30 during the month.

Total shipments from Lake Erie ports during the past season were 30,527,232 tons as compared with 23,481,986 tons during the 1936 season. Dock balance Dec. 1 was 6,073,262 tons compared to 4,918,348 tons as of Dec. 1, 1936. Receipts at Detroit totaled 1,456,853 tons during the season; at Indiana Harbor 2,762,939 tons; Gary 5,715,509 tons; South Chicago 7,321,385 tons; Sault Ste. Marie, Ont., 417,547 tons, and Hamilton, Ont., 697,881 tons, making a total of 18,372,114 tons received at other points than Lake Erie ports as compared with 12,824,487 tons during the previous year.

Pig Iron

Activity in pig iron slackened during the past week, with shipments falling off still further from the low rate prevailing in the earlier part of this month and with very little spot carload business. Producers and sellers got some solace from the fact that foundry coke shipments have been not as far off as iron deliveries, showing that the melt has been running ahead of shipments. From present indications slightly better activity may be expected around the middle of January.

Sheets & Strip

Outside of the receipt of a few additional releases for shipment in early January, the sheet and strip markets have been dull. After the turn of the year a number of orders are in sight for the replacement of depleted inventories. Automobile buying has been irregular and cancellations frequent owing to the short-time basis of inventories and the shutting down of certain units for the holidays.

Bolts, Nuts and Rivets

With requirements of auto manufacturers, railroads, hardware jobbers and miscellaneous buyers reduced during the holiday season, activity of bolt and nut and rivet manufacturers has declined. The bolt and nut industry on the national scale is estimated to be operating at around 30 per cent. Despite the quiet tone of new business, prices are firm.

Warehouse Business

December volume of warehouse business in this district has been off appreciably from the corresponding November period and in some lines December will be the poorest month of the year. Closing of numerous plants has resulted in a weak outlook until January.

Bars, Plates and Shapes

Demand for bars is feeling the effect of the holiday season, mills reporting orders lighter than during the previous few weeks. Many consuming plants are shut down for the holidays. A revival in orders is expected after New Year's. No new structural inquiries are reported. Two jobs are pending. Prospects of an improvement in plate tonnage are indicated by several water line projects. Cleveland is inquiring for 9000 ft. of 36-in. welded steel pipe, and this with other extensions of water lines by northern Ohio municipalities is expected to require approximately 5000 tons of welded pipe.

. . . . BUFFALO. . . .

. . . Republic takes off two open hearths.

BUFFALO, Dec. 28.—Operations have again slacked off, Republic Steel Corp. having taken two open hearths out of production, leaving only one active furnace at its plant. Some pick-up is expected after the holiday recess. Bethlehem's Lackawanna plant continues to operate six units. The total for the district is thus seven.

Contracts for fabricated struc-

tural steel in two western New York districts, Elba and Wyoming, have been awarded to a Buffalo concern. Swarthout & Riley of Rochester are low general bidders on a school at Caledonia. Other allotments of school steel in connection with an extensive building program, will be made after Jan. 1.

. . PHILADELPHIA . .

. . . District rate unchanged at 25 per cent.

o o o

. . . Buying at a standstill, but future looks better.

o o o

. . . Export inquiry a little more insistent.

PHILADELPHIA, Dec. 28.—Operations in the eastern Pennsylvania territory during this holiday week are at a slightly better level than had been anticipated. Although several mills have practically ceased operating, Pencoyd has placed several units in production, and the aggregate district rate thus shows no change from the 25 per cent level of a week ago. Current consumer demands are nil, although there is some miscellaneous tonnage drifting onto mill books for delivery early in the new year. The volume of this tonnage coupled with the generally better sentiment now going the rounds is leading to the belief that the district rate will be close to 30 per cent by the end of January, at which level it probably will be about on a par with the national rate.

Only Ford business is keeping the local autobody stamping plants busy. All other automobile fabrication has been delayed until the first week in January. New York Shipbuilding Co. has placed some of the tonnage required by two Government tenders, but so far Sun Shipbuilding Co. has not been awarded the Standard Oil tankers, even though low bids were turned in on the inquiry. In view of the large amount of ship work under discussion, it is only logical that this district will secure a considerable volume of tonnage during 1938, in which case local and Pittsburgh mills will be directly benefited.

Although there have been a great number of foreign inquiries for finished and semi-finished steel over the past six months, only lately has there been a tendency for these inquiries to go beyond the talking stage and actually to be placed with mills. Last week Japan placed some plate orders in this area, at prices slightly under the domestic level, and several mills are now closing on moderate tonnages for European delivery.

Construction activity is dependent entirely on State financed projects. During the week about 900 tons of shapes was placed with mills, and new projects up for estimating totaled close to 1100 tons, which includes a new hospital building, several college buildings and a highway bridge in New Jersey.

Scrap is listless and prices are unchanged. Scattered export purchases are serving to support the market, although the price trend after the turn of the year will depend primarily on a return of domestic demand.

RAILROAD BUYING

Western Maryland is taking bids on 100 gondola cars, 500 hopper cars and 500 box cars.

Canadian National is inquiring for six locomotives, 2000 box cars and five passenger cars.

White Pass & Yukon has placed an order for one 2-8-2 type locomotive with Baldwin Locomotive Works.

Western Pacific has postponed indefinitely purchase of 400 freight cars, according to C. F. Post, purchasing agent.

RAILS AND TRACK SUPPLIES

Southern Railway has placed an order for 15,000 tons of rails with Tennessee Coal, Iron & Railroad Co.

Chesapeake & Ohio has been authorized to purchase 27,500 tons of 131-lb. rails.

Pere Marquette will purchase 3550 tons of 112-lb. rails for its United States lines and 3350 tons of 105-lb. rails for its Canadian lines.

St. Louis-San Francisco has ordered 13,200 tons of 112-lb. rails and 4800 tons of fastenings from Tennessee Coal, Iron & Railroad Co.

Westinghouse Gives Physics Fellowships

FIVE post-doctorate fellowships for research in modern physics at the Westinghouse research laboratories in East Pittsburgh, Pa., during 1938-39 will be awarded this spring to young scientific workers, Westinghouse Electric & Mfg. Co. announces. Applications must be received by March 1, 1938, and awards will be made known in April, the company said in circulars to universities and technical schools.

Problems in the fields of nuclear physics, electric conduction in gases, ferromagnetism, dielectrics, thermionics, semi-conductors, elastic and plastic properties of metals, and crystal structure are appropriate for study under the fellowship plan, Dr. W. L. Chubb, director of the laboratories, said.

Scrap Cartel Extended A Year

LONDON *(Special Correspondence)*.—At the recent meeting of the international scrap convention in Dusseldorf, Germany, it was decided, because of the present international importance of the scrap cartel, to prolong it until the end of 1938.

This step followed the decision of the International Steel Cartel last September to prolong the International Wire Cartel as a purely export syndicate until June 30, 1938, the date on which other international cartels are due to expire.

A number of new purchases of scrap were agreed on at the Dusseldorf meeting for the early part of 1938 at considerably reduced prices in consequence of the price trend in world markets.

. . . . NEW YORK. . . .

. . . Steel business under influence of holiday dullness.

o o o

. . . Effect of Robert Jackson's speech on steel prices being watched.

o o o

. . . $18,000,000 appropriated for low-cost housing projects.

NEW YORK, Dec. 28.—Steel bookings in December in this district were slightly better than those of November, but the difference is too small to have outstanding significance. The markets this week are under the holiday influence and are extremely dull.

In the present uncertain situation the injection of the steel price issue by an Administration spokesman (Robert Jackson, Assistant Attorney General of the United States) may tend to delay the placing of orders in January. No strong pressure has been exerted by steel buyers for price reductions. However, in plates one or two eastern mills have made concessions from the going prices.

The United States Navy has issued inquiries for 1500 tons of black and galvanized light plate for East and West Coast yards.

A revival of low-cost housing projects in the New York area is promised as a result of the allotment of $18,000,000 from Federal funds for apartment buildings in the Red Hook and Queens Bridge Plaza areas.

Pig Iron

A majority of the plants in this district will be shut down tight while the usual year-end inventory is taken, and furnace shipments are consequently very light. Raw material inventories are being carried into the new year; generally the large plants have larger stocks, in proportion, than the smaller plants. Any movement to replenish stocks will probably originate with the small shops and the extent to which this buying develops will depend upon the rate of new castings orders. A few small lots of pig iron were purchased during the week for delivery early in January and some sellers report receipt of several first quarter inquiries, but none very large. The Japanese activity reported last week developed into a 50,000-ton order, split between two Southern furnaces.

Reinforcing Bars

Considerable activity is developing in small projects and, although the individual tonnages do not exceed 75 tons, collectively they aggregate a fair-sized tonnage. The largest new inquiry out this past week is for a grade crossing elimination project at Lynbrook, N. Y., which will take 1400 tons of bars. An exhibit building at the World's Fair will require 135 tons.

. . . . PIPE LINES. . . .

Texas Co., New York, has purchased approximately 24,000 tons of 12¾ in. pipe for a 225-mile line in Columbia, South America, which was allocated approximately as follows: Republic Steel Corp., 10,000 tons; National Tube Co., 10,000 tons; Jones & Laughlin Steel Corp., 4000 tons.

Cleveland will take bids about Jan. 14 on 9000 ft. of 36-in. steel water pipe for a line from Palmer Reservoir by way of Hauserman Road to Brookpark Road on West Side.

Southern Pipe Line Co., 411 North Broadway, Corpus Christi, Tex., plans new 20-in. welded steel pipe line from plant of Southern Minerals Corp., in Saxet, Tex., oil field area to carbon black production plant of Columbian Carbon Co., to be built in northwest district of same field, about 15,500 ft. in all, for residue natural gas supply for latter plant. Plans also are under way for new 4-in. welded steel pipe line from gas area in western part of Neuces County, Tex., to connection with main pipe line system in Agua Dulce, Tex., gas field, for natural gas transmission. Expansion will be carried out in steel pipe line gathering systems in different gas field areas, including about eight miles in Saxet district noted.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 7 for corrosion-resisting steel pipe and steel tubing for Eastern Navy yards and Puget Sound yard (Schedule 2433).

Sunset, La., has authorized fund of $40,000 for steel pipe line system for natural gas distribution, including control station and operating facilities.

Sioux City Gas & Electric Co., Sioux City, Iowa, a subsidiary of Penn-Western Gas & Electric Co., same place, is arranging for acquisition of Yankton Gas Co., Yankton, S. D., and will convert company from an artificial to natural gas utility. A fund of $82,000 has been authorized for immediate construction of a welded steel pipe line from connection with main pipe line of purchasing company to Yankton, for natural gas transmission, with control station at municipal limits and pipe line extensions for distribution. Acquisition of property is scheduled for consummation in January.

Tacoma, Wash., has low bid from Hydraulic Supply & Mfg. Co., 7500 South Eighth Street, Seattle, for 8300 ft. of 48-in. electrically-welded steel pipe with fittings at $120,862, for water system.

Bellingham, Wash., has authorized bond issue of $750,000 for extensions and improvements in water system, including new 24-in. steel pipe line for water supply for mill of Puget Sound Pulp & Timber Co., which is expanding plant. Water intake for service will be established on Lake Whatcom.

Bureau of Reclamation, Denver, closes bids Jan. 4 for two 50-in. inside diameter welded plate-steel outlet pipes for installation in outlet works at Boca dam, Truckee storage project, Nevada-California (Specifications 1003-D).

Victory Petroleum Co., Abilene, Tex., plans steel pipe line gathering system in connection with development of oil producing properties in east Texas oil field. Entire project will cost over $85,000. J. E. Force is secretary and treasurer.

Silver Lake Water District, Silver Lake, Wash., will call for bids Jan. 3 on 64,580 ft. of 2 to 8-in. steel pipe and fittings.

Seattle, Wash., which was scheduled to open bids Dec. 27 on 42,808 ft. of pipe has rescinded bid call until bonds necessary to finance project are sold. Another Seattle project involving extension of water distribution system has been proposed. About $200,000 will be spent and 12, 16, 24 and 36-in. pipe will be used. N. A. Carle is city engineer.

Angle Lake Water District 53, King County, Wash., was formally organized following election Oct. 30. About $14,000 will be spent for pipe line soon. Parker & Hill, Smith Tower, Seattle, are consulting engineers.

Ontario, Ore., has awarded irrigation system pipe line to bidder specifying concrete pipe.

Anderson-Prichard Oil Corp., Oklahoma City, Okla., has completed surveys for a gasoline pipe line extending from Colorado, Tex., to Des Moines, Iowa. The projected line will be 1350 miles long and cost about $12,000,000.

Wm. Steinen Mfg. Co., Newark, N. J., manufacturer of screw products and metal goods, recently purchased a three-story factory building at 43 Bruen Street, where it is now located.

Assistant Attorney General Attacks Steel Industry for "Steep" Price Increases

WASHINGTON, Dec. 28.—The radio broadcast Sunday night of Robert H. Jackson, Assistant Attorney General, in which he attacked the steel and other so-called "big business" is interpreted as bringing to a definite conclusion the purpose of the New Deal Administration to proceed with anti-trust prosecution. Jackson, as trust buster of the Department of Justice, blamed "big business" for monopolistic practices which he held are responsible for high prices and the resulting recession.

The broadcast reflected the usual technique of attempting to shift responsibility for the let-up in business from the Administration, whose policies of unlimited spending with ensuing high taxes and its legislative program of heavy wage increases are commonly charged with bringing on the recession.

The Jackson blast was taken to indicate that the Administration will proceed with rigid revision of the anti-trust laws soon after the regular session of Congress convenes. It was considered also to be probable that even before legislative action is taken the Department of Justice may enter upon further prosecution against so-called big industries.

Specifically Attacks Steel

Jackson's address, particularly bitter in tone, specifically attacked the steel, cement and copper industries. It was considered significant that these particular industries employ the basing point system which has been assailed as being responsible for allegedly high prices and identical bidding. The Administration, through both the Federal Trade Commission and the Department of Justice, has these practices under attack and apparently is determined to abolish the basing point system of quoting prices if it can find a way to do it.

A development following the Jackson speech indicates that the drive against "big business" may also be tied in with the forthcoming Senate inquiry on relief and unemployment at which steel and other industrial leaders will be called to testify.

On the other hand, it is reported that the Department of Justice may be asked to produce data Jackson says it has to show that price increases have been greater than wage increases. His remarks on this score are at complete variance with contentions of industrialists. Jackson particularly pointed to the steel industry in making his argument that price increases have not been justified by wage increases.

Says Increases Were Too Steep

In the course of his address, which was entitled "Business Confidence and Government Policy," Jackson made the following remarks, which have created widespread comment:

"I know how the impression has been given that the steep price rises of the last year have been due to wage increases forced upon industry by the new growth of labor unions. From what I think I know—that impression is not accurate—or at the most only half accurate. Take for instance the most dramatic wage increase of the year—the 10 per cent wage increase in steel. I have in Washington a detailed and authoritative study as to increases in steel prices, wages and costs between April-June, 1936, and April-June, 1937. This study shows that the increases in iron and steel prices, effective Dec. 1, 1936, and March 1, 1937, were three times as great as necessary to cover the increased wages paid to steel workers and at least twice the amount necessary to cover the increases in the cost of both labor and raw material during the same period.

"The total increase in steel plant wages and in higher costs of materials which would reflect wage increases elsewhere could have been covered by an increase of 9.1 per cent in prices. But the actual increase in steel prices, according to this expert, was not 5 per cent, not 9 per cent; it was 21 per cent."

Senate Itself to Check Unemployed

WASHINGTON, Dec. 28.—Taking the problem in its own hands for the first time since the New Deal came into power, the Senate is going to make an unemployment inquiry beginning Jan. 4 in order to provide a comprehensive analysis of the sharp business setback and will call steel, automobile, textile and organized labor leaders to get their views along with those of Government officials.

The inquiry will be made by the Senate under the direction of Senator Byrnes, Democrat of South Carolina, who was selected by Vice-President Garner.

U. S. Steel Takes Space In Koppers Building

UNITED STATES STEEL CORP. has rented four floors in the Koppers Building, Grant Street, Pittsburgh, to house recently-appointed executives who will manage the many subsidiaries and plants of the corporation.

Benjamin F. Fairless, president, will head the group of New York and Pittsburgh officials of the corporation moving their headquarters to the Koppers Building. Offices for Mr. Fairless, now at the Carnegie Building, Pittsburgh, will be established both in Koppers Building and at 71 Broadway, New York, where Edward L. Stettinius, Jr., chairman-elect of the United States Steel Corp. of New Jersey, and the organization's financial officers will remain.

Offices of the *U. S. Steel News*, monthly publication circulated to the corporation's more than 200,000 employees, is scheduled to be moved from New York to Pittsburgh with the various sales, operating and other departments, involving approximately 100 persons, whose transfer has already been announced.

To Discuss Hydraulic Feeds on Machine Tools

A DISCUSSION of hydraulic feeds on machine tools by Arthur Swenson of the Sundstrand Machine Tool Co., will feature the Jan. 13 meeting of the Detroit chapter of the American Society of Tool Engineers. The meeting activity will be sponsored by the John E. Livingstone Co., Detroit, and will be held at the Tuller Hotel. Nomination and election of officers for 1938 will be held at this session.

. . . NON-FERROUS . . .

. . . Copper sales average 900 tons daily.

o o o

. . . Lead stocks rise 12,927 tons.

o o o

. . . Zinc sales very light; price unchanged.

NEW YORK, Dec. 27.—The holiday doldrums have advanced upon the non-ferrous markets and buying has been very light, with prices of the major metals unchanged from the previous week's levels. Copper sales during the past week averaged about 900 tons per day. The month's total through last Thursday is 21,874 tons, or almost double the total of a comparable period in November. Electrolytic quotations remain split between 10.125c. and 11c. per lb., Connecticut Valley. The holidays have also cut the volume of export metal sales considerably and Friday's price of 9.95c. per lb., c.i.f., usual European base ports, is practically the same as the price of a week ago.

The Week's Prices. Cents Per Pound for Early Delivery

	Dec. 21	Dec. 22	Dec. 23	Dec. 24	Dec. 27
Electrolytic copper, Conn.*	10.125	10.125	10.125	10.125	10.125
Lake copper, N. Y.	11.125	11.125	11.125	11.125	11.125
Straits tin, spot, New York	42.00	42.75	42.00	42.00	42.00
Zinc, East St. Louis	5.00	5.00	5.00	5.00	5.00
Zinc, New York	5.35	5.35	5.35	5.35	5.35
Lead, St. Louis	4.60	4.60	4.60	4.60	4.60
Lead, New York	4.75	4.75	4.75	4.75	4.75

*Delivered Connecticut Valley; price ¼c. lower delivered in New York.
Aluminum, virgin, 99 per cent plus 20.00c.-21.00c. a lb., delivered.
Aluminum No. 12 remelt No. 2 standard, in carloads, 19.00c. to 19.50c. a lb., delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 15.00c. a lb., prompt, f.o.b., New York.
Antimony, American, 13.75c. per lb., prompt shipment, New York.
Quicksilver $81.00 to $83.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 11.25c. a lb., less carload, delivered in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	43.50c. to 44.50c.
Tin, bar	45.50c. to 46.50c.
Copper, Lake	12.75c. to 13.75c.
Copper, electrolytic	12.75c. to 13.75c.
Copper, castings	12.50c. to 13.50c.
*Copper sheets, hot-rolled	19.125c.
*High brass sheets	17.375c.
*Seamless brass tubes	20.125c.
*Seamless copper tubes	19.875c.
*Brass rods	13.375c.
Zinc, slabs	6.75c. to 7.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	12.00c.
Lead, American pig	5.75c. to 6.75c.
Lead, bar	7.00c. to 8.00c.
Lead, sheets, cut	8.50c.
Antimony, Asiatic	16.00c. to 17.00c.
Alum., virgin, 99 per cent plus	22.50c. to 24.00c.
Alum., No. 1 for remelting, 98 to 99 per cent	19.50c. to 21.00c.
Solder, ½ and ½	30.00c. to 32.00c.
Babbitt metal, commercial grade	20.00c. to 60.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 25 per cent allowed off for extras, except copper sheets and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	46.375c.
Tin, bar	48.375c.
Copper, Lake	12.00c. to 12.25c.
Copper, electrolytic	12.00c. to 12.25c.
Copper, castings	10.50c. to 10.75c.
Zinc, slabs	8.25c. to 8.50c.
Lead, American pig	5.25c. to 5.50c.
Lead, bar	8.75c.
Antimony, Asiatic	17.25c. to 17.75c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	60.635c.
Solder, ½ and ½	26.25c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.875c.	8.625c.
Copper, hvy. and wire	7.25c.	7.75c.
Copper, light and bottoms	6.25c.	6.50c.
Brass, heavy	4.375c.	5.00c.
Brass, light	3.375c.	4.125c.
Hvy. machine composition	6.875c.	7.375c.
No. 1 yel. brass turnings	4.75c.	5.25c.
No. 1 red brass or compos. turnings	6.50c.	7.00c.
Lead, heavy	4.00c.	4.375c.
Cast aluminum	10.625c.	11.75c.
Sheet aluminum	12.00c.	13.50c.
Zinc	2.875c.	3.125c.

Zinc

Sales for the week ended Dec. 18 dropped to 740 tons from 1661 tons in the previous week, and deliveries declined 340 tons to 3120 tons. Unfilled orders at the end of the same week amounted to 56,116 tons, a reduction of 2380 tons from the previous week. Consumers' purchases during the week have been very light, the week's total probably being under the 700-ton mark. Prime Western quotations have remained at the 5.35c. per lb., New York, basis. Inactivity also rules in the London market and quotations have been fluctuating around the 3.43c. level.

Lead

Stocks at the end of November, totaling 113,573 tons, were 12,927 tons above the preceding month's total. This represents the third consecutive monthly gain from the year's low of 90,742 tons in September. Shipments in November declined to 33,853 tons from 39,292 tons in October, and production also receded, the November total being 46,796 tons, as compared with 49,197 tons in the previous month. The week's market activity was limited to a light volume of carload orders for immediate delivery at the unchanged price bass of 4.75c. per lb., New York.

Tin

Moderate tonnages were bought during the first four days of last week at prices that ranged from 42c. to 42.75c., but today the market dropped back into the usual holiday dullness. Today's quotation of 42c. per lb., New York, for Straits tin, is strictly nominal in the absence of any bids to test it. Buying abroad has been in small quantity at prices ranging between £185 and £186.

Installation of another electric melting furnace capable of melting one ton per hour and doubling the company's previous capacity, has been completed by the Standard Alloy Co., Inc., Cleveland. The new furnace operates at 11,000 volts primary, and two individual 11,000 volt lines were brought into the plant about a mile to serve it.

IRON AND STEEL SCRAP

. . . No. 1 steel advances 50c. at Pittsburgh on a 2000-ton sale into consumption.

o o o

. . . Composite at $13.75 is 83c. above low point of year.

DEC. 28.—Based upon a sale of 2000 tons of dealers' No. 1 steel into consumption Monday at $14.50 a ton, Pittsburgh district, the average on that grade has advanced 50c. a ton for the second time, after holding its own for a week. At Chicago, reduction of shipments by some district mills has brought the rise there to a standstill; Philadelphia prices also remain unchanged. As a result, THE IRON AGE composite figure now stands at $13.75, up 17c. from last week and 83c. above the low point for the year of $12.92, last recorded on Nov. 30. No. 1 steel at Pittsburgh is now $1 above its low and is currently quoted the same as at Philadelphia. For five weeks, the Philadelphia price was 50c. to $1 higher, largely as a result of bidding by exporters. The same influence is expected to bring higher prices for railroad lists being closed this week in several districts. Most other markets are nominally unchanged, with the exception of Cleveland, where some prices are up 50c. on stronger sentiment.

Pittsburgh

A sale on Monday of 2000 tons of No. 1 steel at $14.50, delivered this district, has resulted in an advance of 50c. a ton on this item. No. 2 steel and hydraulic bundles have been marked up sympathetically. During the past week, $13.50 to $14 had been paid by brokers for No. 1 steel. With heavy export demand prevailing, little or no scrap is being laid down by dealers in this district. Domestic consumers will undoubtedly have to compete with export coverage on railroad lists being closed this week.

Chicago

Reduction of shipments by some district mills has caused the rise of this market in the past few weeks to come to a standstill, prices remaining mostly nominal in the absence of mill sales. Broker bids range from $13.50 to $14 for No. 1 steel but not a great deal of material is coming out. Bidding for coverage on old high-priced orders constitutes most of the activity here.

Cleveland

The market has become sentimentally firmer, No. 1 heavy melting steel being quoted $12.50 to $13, up 50c. from the previous level and other open-hearth grades also advancing by 50c. per ton. While dealers offering prices on miscellaneous scrap are stronger, material has not become freer to any great extent. Gradual improvement in steel works operations is expected after the turn of the year, but prospects are poor for immediate sales into mill consumption.

Buffalo

Dealers are shipping on old orders. No new tonnages have been placed. A few odd lots of No. 1 machinery cast and No. 1 cupola cast have been sold at the market quotations, but No. 1 and No. 2 steel sales are conspicuously absent. Sales of machine shop turnings to Niagara Falls at $8 are noted. This makes the price of this commodity at Buffalo slightly less than $7, allowing for freight.

St. Louis

Dealers who two weeks ago predicted that mills would buy scrap iron before the turn of the new year, now say that there will be no buying until after Jan. 15. Meanwhile the market is marking time.

Cincinnati

Approach of the New Year with nearness of expected business improvement brought more optimistic sentiment into the district old materials market. Prices are unchanged, although the undertone is strong. Mills show no inclination to enter the market, although material on contract is moving.

Detroit

News that the major steel producer in this area is no longer operating any of its open hearths contributed this week to a weakened sentiment in the Detroit scrap market. Forthcoming lists from the automobile companies and automotive suppliers are expected to be extremely light in tonnage because most of the automobile plants will be closed through the first 10 days or two weeks of January. During the pre-holiday season the market was dormant and except for the closing of automotive lists before Jan. 1 little other activity is expected.

New York

Feeling is definitely better but there have been no mark-ups in dealers' buying prices. On the other hand, there is increasing reluctance on the part of holders of scrap to part with their material. Meanwhile, with buying prices unchanged for the ninth consecutive week, export material flows out of the harbor at a steady pace toward European ports. Japan has issued no new orders for scrap in the last seven months, and no one in the trade looks for any buying in the near future as a result of renewed activity in pig iron sales.

Boston

Figures released by the collector of port show steel scrap has become Boston's No. 1 export. From Jan. 1, last, until Dec. 16, 227,000 tons in full cargoes left Boston. Part cargoes swell the total materially. Two full cargoes are now loading here and four are scheduled to start loading shortly. Some exporters have raised bids on Nos. 1 and 2 steel at least 50c. a ton. At Providence two boats are still completing cargoes, a third has started loading 2200 tons and will take 4400 tons at Bridgeport, Conn. Pennsylvania consumers offered $3.50 a ton on cars for steel turnings; Weirton now offers $2.60 and is obtaining some. Blast furnace material is moving in a small way at $6.60 a ton on cars. The Phillipsdale, R. I., steel mill is closed, but offers 50c. to $1 a ton premium for No. 1 railroad type steel scrap.

Philadelphia

The market here is a listless affair, what with the regular holiday interruption in business and the total absence of either buying or selling pressure of any moment. Several small purchases of No. 2 and stove plate have established these grades 50c. higher, but No. 1 is unchanged and untested. One boat left Port Richmond last week, and another left yesterday, and still another export boat is expected to touch both Port Richmond and Girard Point early in January. Those dealers who are holding onto supplies expecting a sharp increase in the first week of January will probably be disappointed inasmuch as mill recovery is likely to start at a somewhat later date and proceed at a very slow pace. A rerolling mill, a major purchaser of shafting here, has lately installed electric furnaces and will make small ingots; thus shafting purchases will probably almost disappear, and this grade may even be dropped from the price list after a short test period.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to	$14.50
Railroad hvy. mltng. ..	14.75 to	15.25
No. 2 hvy. mltng. steel.	12.50 to	13.00
Scrap rails	14.75 to	15.25
Rails 3 ft. and under..	18.00 to	18.50
Comp. sheet steel	14.00 to	14.50
Hand bundled sheets..	13.00 to	13.50
Hvy. steel axle turn..	12.00 to	12.50
Machine shop turn.....	7.50 to	8.00
Short shov. turn.	7.50 to	8.00
Mixed bor. & turn.....	6.50 to	7.00
Cast iron borings	6.50 to	7.00
Cast iron carwheels...	15.00 to	15.50
Hvy. breakable cast...	12.50 to	13.00
No. 1 cupola cast.. ...	16.00 to	16.50
RR. knuckles & cplrs..	18.00 to	18.50
Rail coil & leaf springs	18.00 to	18.50
Rolled steel wheels....	18.00 to	18.50
Low phos. billet crops.	18.00 to	18.50
Low phos. sh. bar	17.50 to	18.00
Low phos. punchings..	16.50 to	17.00
Low phos. plate, hvy...	17.00 to	17.50
Low phos. plate clips..	14.50 to	15.00
Steel car axles.....	17.50 to	18.00

PHILADELPHIA

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel.	$14.00 to	$14.50
No. 2 hvy. mltng. steel.	13.00 to	13.50
Hydraulic bund., new..	14.00 to	14.50
Hydraulic bund., old...	10.00 to	10.50
Steel rails for rolling	17.00 to	17.50
Cast iron carwheels...	16.00 to	16.50
Hvy. breakable cast...	14.00 to	14.50
No. 1 cast.	16.50 to	17.00
Stove plate (steel wks.)	13.00 to	13.50
Railroad malleable	16.00 to	16.50
Machine shop turn....	9.00 to	9.50
No. 1 blast furnace....	8.25 to	8.75
Cast borings	8.50 to	9.00
Heavy axle turnings...	11.50 to	12.00
No. 1 low phos. hvy...	18.00 to	18.50
Couplers & knuckles..	18.00 to	18.50
Rolled steel wheels....	18.00 to	18.50
Steel axles	20.00 to	20.50
Shafting	19.50 to	20.00
No. 1 RR. wrought.....	16.00 to	16.50
Spec. iron & steel pipe	13.00 to	13.50
No. 1 forge fire.....	12.00 to	12.50
Cast borings (chem.)..	13.50 to	14.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$12.50 to	$13.00
Auto. hvy. mltng. steel alloy free	11.00 to	11.50
No. 1 auto. steel	10.50 to	11.00
Shoveling steel	12.50 to	13.00
Hydraul. comp. sheets.	11.50 to	12.00
Drop forge flashings...	10.00 to	10.50
No. 1 busheling	11.50 to	12.00
No. 2 busheling, old...	5.75 to	6.25
Rolled carwheels	16.00 to	16.50
Railroad tires, cut	16.25 to	17.25
Railroad leaf springs..	17.00 to	17.50
Steel coup. & knuckles	16.00 to	16.50
Axle turnings	12.00 to	12.50
Coil springs	17.50 to	18.00
Axle turn. (elec.)	12.50 to	13.00
Low phos. punchings..	16.00 to	16.50
Low phos. plates, 12 in. and under	15.50 to	16.00
Cast iron borings	6.50 to	7.00
Short shov. turnings...	8.50 to	9.00
Machine shop turn.....	7.00 to	7.50
Rerolling rails	15.25 to	15.75
Steel rails under 3 ft....	15.50 to	16.00
Steel rails under 2 ft....	16.00 to	16.50
Angle bars, steel	15.25 to	15.75
Cast iron carwheels...	15.25 to	15.75
Railroad malleable ...	14.75 to	15.25
Agric. malleable	12.25 to	12.75
	Per Net Ton	
Iron car axles	$19.00 to	$19.50
Steel car axles	17.00 to	17.50
No. 1 RR. wrought....	10.50 to	11.00
No. 2 RR. wrought	11.25 to	11.75
Locomotive tires	15.75 to	16.25
Pipes and flues	9.25 to	9.75
No. 1 machinery cast..	12.55 to	12.75
Clean auto. cast	12.00 to	12.50
No. 1 railroad cast....	11.25 to	11.75
No. 1 agric. cast.....	11.25 to	11.75
Stove plate	9.00 to	9.50
Grate bars	9.00 to	9.50
Brake shoes	8.50 to	9.00

YOUNGSTOWN

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel.	$13.00 to	$13.50
Hydraulic bundles	12.50 to	13.00
Machine shop turn.....	10.00 to	10.50

CLEVELAND

Per gross ton to delivered to consumer:

No. 1 hvy. mltng. steel.	$12.50 to	$13.00
No. 2 hvy. mltng. steel.	11.50 to	12.00
Comp. sheet steel	12.00 to	12.50
Light bund. stampings.	9.00 to	9.50
Drop forge flashings...	11.50 to	12.00
Machine shop turn. ...	7.50 to	8.00
Short shov. turn.	9.00 to	9.50
No. 1 busheling	11.50 to	12.00
Steel axle turnings ...	10.00 to	10.50
Low phos. billet and bloom crops	18.50 to	19.50
Cast iron borings	8.50 to	9.00
Mixed bor. & turn. ...	8.50 to	9.00
No. 2 busheling	8.50 to	9.00
No. 1 cast	16.50 to	17.00
Railroad grate bars...	8.00 to	8.50
Stove plate	8.00 to	8.50
Rails under 3 ft.	18.00 to	18.50
Rails for rolling	16.00 to	16.50
Railroad malleable	16.00 to	16.50
Cast iron carwheels...	15.00 to	15.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$13.00 to	$13.50
No. 2 hvy. mltng. steel.	11.00 to	11.50
Scrap rails	13.00 to	13.50
New hvy. b'ndled sheets	11.00 to	11.50
Old hydraul. bundles..	10.00 to	10.50
Drop forge flashings ..	11.00 to	11.50
No. 1 busheling	11.00 to	11.50
Hvy. axle turnings ...	11.50 to	12.00
Machine shop turn.....	6.75 to	7.25
Knuckles & couplers..	16.50 to	17.00
Coil & leaf springs....	16.50 to	17.00
Rolled steel wheels....	16.50 to	17.00
Low phos. billet crops.	17.50 to	18.00
Shov. turnings	9.50 to	10.00
Mixed bor. & turn.....	8.50 to	9.00
Cast iron borings.....	8.50 to	9.00
Steel car axles.....	16.50 to	17.00
No. 1 machinery cast.	15.00 to	15.50
No. 1 cupola cast.....	14.00 to	14.50
Stove plate	12.00 to	12.50
Steel rails under 3 ft..	17.00 to	17.50
Cast iron carwheels...	15.00 to	15.50
Railroad malleable ...	15.00 to	15.50
Chemical borings	10.50 to	11.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$13.00 to	$13.50
No. 1 hvy. melting....	13.00 to	13.50
No. 2 hvy. melting....	12.00 to	12.50
No. 1 locomotive tires.	16.00 to	16.50
Misc. stand.-sec. rails.	13.50 to	14.00
Railroad springs	15.00 to	15.50
Bundled sheets	8.00 to	8.50
No. 1 busheling	7.00 to	7.50
Cast bor. & turn.....	6.00 to	6.50
Rails for rolling	14.50 to	15.00
Machine shop turn....	6.00 to	6.50
Heavy turnings	8.50 to	9.00
Steel car axles.....	19.50 to	20.00
Iron car axles.....	21.50 to	22.00
No. 1 RR. wrought....	8.00 to	8.50
No. 2 RR. wrought....	13.00 to	13.50
Steel rails under 3 ft..	16.00 to	16.50
Steel angle bars	14.50 to	15.00
Cast iron carwheels...	13.50 to	14.00
No. 1 machinery cast..	12.75 to	13.25
Railroad malleable	13.50 to	14.00
No. 1 railroad cast....	13.25 to	13.75
Stove plate	9.00 to	9.50
Agricul. malleable	10.00 to	10.50
Grate bars	9.50 to	10.00
Brake shoes	9.50 to	10.00

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to	$10.00
No. 2 hvy. mltng. steel.	7.50 to	8.00
Scrap rails for mltng.	14.50 to	15.00
Loose sheet clippings.	6.00 to	6.50
Hydrau. b'ndled sheets	9.50 to	10.00
Cast iron borings.....	3.50 to	4.00
Machine shop turn....	4.00 to	4.50
No. 1 busheling.....	8.00 to	8.50
No. 2 busheling.....	3.00 to	3.50
Rails for rolling.....	16.50 to	17.00
No. 1 locomotive tires.	13.00 to	13.50
Short rails	17.00 to	17.50
Cast iron carwheels..	11.50 to	12.00
No. 1 machinery cast.	10.50 to	11.00
No. 1 railroad cast....	9.00 to	9.50
Burnt cast	5.50 to	6.00
Stove plate	5.50 to	6.00
Agricul. malleable ...	10.50 to	11.00
Railroad malleable ...	12.50 to	13.00
Mixed hvy. cast.....	7.50 to	8.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel....	$16.00 to	$16.50
Scrap steel rails.....	....	17.00
Short shov. turnings..	....	8.50
Stove plate	....	10.50
Steel axles	18.00 to	19.00
Iron axles	15.50 to	18.00
No. 1 RR. wrought....	13.00 to	15.00
Rails for rolling.....	18.00 to	20.00
No. 1 cast.....	16.00 to	18.00
Tramcar wheels	16.00 to	18.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$9.50 to	$10.00
No. 2 hvy. mltng. steel.	8.00 to	8.50
Borings and turnings..	6.25 to	6.75
Long turnings	5.75 to	6.25
Short shov. turnings...	6.75 to	7.25
No. 1 machinery cast.	11.75 to	12.25
Automotive cast	12.75 to	13.25
Hvy. breakable cast...	10.25 to	10.75
Hydraul. comp. sheets.	10.50 to	11.00
Stove plate	7.50 to	8.00
New factory bushel....	9.50 to	10.00
Old No. 2 busheling...	5.00 to	5.50
No. 2 busheling (black fender stock)		Nominal
Sheet clippings	7.00 to	7.50
Flashings	8.50 to	9.00
Low phos. plate scrap.	10.50 to	11.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to	$11.00
No. 2 hvy. mltng steel.	9.00 to	9.50
Hvy. breakable cast...	9.50 to	10.00
No. 1 machinery cast.	11.50 to	12.00
No. 2 cast.....	9.50 to	10.00
Stove plate	8.50 to	9.00
Steel car axles.....	19.00 to	19.50
Shafting	16.00 to	16.50
No. 1 RR. wrought....	11.00 to	11.50
No. 1 wrought long...	10.00 to	10.50
Spec. iron & steel pipe	9.00 to	9.50
Rails for rolling.....	16.00 to	16.50
Clean steel turnings..	5.00 to	5.50
Cast borings	5.00 to	5.50
No. 1 blast furnace....	5.00 to	5.50
Cast borings (chem.)..	10.00 to	10.50
Unprepar. yard scrap..	7.50 to	8.00

Per gross ton, delivered local foundries:

No. 1 machn. cast.....	$15.50 to	$16.00
No. 2 cast.....	11.00 to	11.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.30 to	$13.80
Scrap rails	13.30 to	13.80
No. 2 steel.....	12.30 to	12.80
Breakable cast.	....	8.50
Machine shop turn.....	....	2.60
Mixed bor. & turn.....	....	2.50
Bun. skeleton long.....	....	6.60
Shafting	17.50 to	18.00
Cast bor. chemical....	8.00 to	8.50

Per gross ton delivered consumers' yards:

Textile cast.....	$15.50 to	$16.00
No. 1 machine cast...	15.50 to	16.00

PACIFIC COAST

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$10.50 to	$11.00
No. 2 hvy. mltng. steel.	9.50 to	10.00

CANADA

Dealers' buying prices at their yards, per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.50	$9.50
No. 2 hvy. mltng. steel.	9.50	8.50
Mixed dealers steel....	8.50	7.50
Scrap pipe	8.50	7.50
Steel turnings	7.50	7.00
Cast borings	8.50	7.50
Machinery cast	15.00	14.00
Dealers cast	13.00	12.00
Stove plate	11.00	10.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges		
No. 1 hvy. mltng. steel.	....	$13.50
No. 2 hvy. mltng. steel.	....	12.00
No. 2 cast.....	....	11.00
Stove plate	8.50 to	9.00
Boston on cars at Army Base or Mystic Wharf		
No. 1 hvy. mltng. steel.	$14.00 to	$14.50
No. 2 hvy. mltng. steel.	13.00 to	13.50
Rails (scrap)	14.00 to	14.50
Philadelphia, delivered alongside boats. Port Richmond		
No. 1 hvy. mltng. steel.	$14.50 to	$15.00
No. 2 hvy. mltng. steel.	13.50 to	14.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

Per Gross Ton

Rerolling $37.00
Forging quality 43.00

Sheet Bars

F. o. b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer $37.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared ..... 2.10c.

Wire Rods

(No. 5 to 9/32 in.)

Per Gross Ton

F.o.b. Pittsburgh or Cleveland. $47.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 48.00
F.o.b. Worcester, Mass. 49.00
F.o.b. Birmingham 50.00
F.o.b. San Francisco 56.00
F.o.b. Galveston 53.00

Rods over 9/32 in. or 47/64 in., inclusive, $5 a ton over base.

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh ..... 2.45c.
F.o.b. Chicago or Gary..... 2.50c.
F.o.b. Duluth ..... 2.60c.
Del'd Detroit ..... 2.60c.
F.o.b. Cleveland ..... 2.50c.
F.o.b. Buffalo ..... 2.55c.
Del'd Philadelphia ..... 2.75c.
Del'd New York ..... 2.80c.
F.o.b. Birmingham ..... 2.60c.
F.o.b. cars dock Gulf ports.... 2.85c.
F.o.b. cars Pacific Ports ..... 3.00c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.30c
F.o.b. Cleveland, Chicago, Gary or Moline, Ill..... 2.35c.
F.o.b. Buffalo ..... 2.40c.
F.o.b. Birmingham ..... 2.45c.
F.o.b. cars dock Gulf ports .. 2.70c.
F.o.b. cars dock Pacific ports.. 2.85c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh ..... 2.45c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham ..... 2.50c.
Del'd Detroit ..... 2.60c.
F.o.b. cars dock Gulf ports.... 2.85c.
F.o.b. cars dock Pacific ports.. 2.85c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributers)

F.o.b. Pittsburgh ..... 2.30c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham ..... 2.35c.
F.o.b. cars dock Gulf ports ... 2.70c.
F.o.b. cars dock Pacific ports.. 2.70c.

Iron

F.o.b. Chicago ..... 2.40c.
F.o.b. Pittsburgh (refined) .... 3.60c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh ..... 2.90c.
F.o.b. Cleveland, Chicago and Gary ..... 2.95c.
F.o.b. Buffalo ..... 3.00c.
F.o.b. Detroit ..... 2.95c.

* In quantities of 10,000 to 19,999 lb.

Plates

Base per Lb.

F.o.b. Pittsburgh ..... 2.25c.
F.o.b. Chicago or Gary..... 2.30c.
Del'd Cleveland ..... 2.445c.
F.o.b. Coatesville or Spar. Pt.. 2.35c.
Del'd Philadelphia ..... 2.44c.
Del'd New York ..... 2.54c.
F.o.b. Birmingham ..... 2.40c.
F.o.b. cars dock Gulf ports ... 2.65c.
F.o.b. cars dock Pacific ports. 2.80c.
Wrought iron plates, f.o.b. Pittsburgh ..... 3.80c.

Floor Plates

F.o.b. Pittsburgh ..... 3.50c.
F.o.b. Chicago ..... 3.55c.
F.o.b. Coatesville ..... 3.60c.
F.o.b. cars dock Gulf ports ... 3.90c.
F.o.b. cars dock Pacific ports. 4.05c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh ..... 2.25c.
F.o.b. Chicago ..... 2.30c.
Del'd Cleveland ..... 2.445c.
F.o.b. Buffalo or Bethlehem.. 2.35c.
Del'd Philadelphia ..... 2.465c.
Del'd New York.....2.5125c.
F.o.b. Birmingham (standard) 2.40c.
F.o.b. cars dock Gulf ports .. 2.65c.
F.o.b. cars dock Pacific ports 2.80c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh ..... 2.60c.
F.o.b. Chicago or Buffalo..... 2.70c.
F.o.b. cars dock Gulf or Pacific Coast ports ..... 3.05c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton.....$42.50
Angle bars, per 100 lb..... 2.80

F.o.b. Basing Points

Light rails (from billets) per gross ton $43.00
Light rails (from rail steel) per gross ton 42.00

Base per Lb.

Spikes ..... 3.15c.
Tie plates, steel..... 2.30c.
Tie plates, Pacific Coast ports. 2.40c.
Track bolts, to steam railroads 4.35c.
Track bolts, to jobbers, all sizes (per 100 counts) 65-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh ..... 2.40c.
No. 10, f.o.b. Gary ..... 2.50c.
No. 10, del'd Detroit ..... 2.60c.
No. 10, del'd Philadelphia .... 2.70c.
No. 10, f.o.b. Granite City .... 2.60c.
No. 10, f.o.b. Birmingham .... 2.55c.
No. 10, f.o.b. cars dock Pacific ports ..... 2.95c.
No. 10 wrought iron, P'gh.... 4.25c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh ..... 3.15c.
No. 24, f.o.b. Gary ..... 3.25c.
No. 24, del'd Detroit ..... 3.35c.
No. 24, del'd Philadelphia .... 3.45c.
No. 24, f.o.b. Granite City .... 3.35c.
No. 24, f.o.b. Birmingham .... 3.30c.
No. 24, f.o.b. cars dock Pacific ports ..... 3.80c.
No. 24, wrought iron, Pittsburgh ..... 5.15c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh. 3.10c.
No. 10 gage, f.o.b. Gary ..... 3.20c.
No. 10 gage, f.o.b. Detroit .... 3.30c.
No. 10 gage, del'd Philadelphia 3.40c.
No. 10, f.o.b. Granite City..... 3.30c.
No. 10 gage, f.o.b. Birmingham. 3.25c
No. 10 gage, f.o.b. cars dock Pacific ports ..... 3.70c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh. 3.55c.
No. 20 gage, f.o.b. Gary ..... 3.65c.
No. 20 gage, del'd Detroit .... 3.75c.
No. 20 gage, del'd Philadelphia 3.85c.
No. 20, f.o.b. Granite City .... 3.75c.
No. 20 gage, f.o.b. Birmingham 3.70c.
No. 20 gage, f.o.b. cars, dock Pacific ports ..... 4.10c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh. 3.80c.
No. 24, f.o.b. Gary ..... 3.90c.
No. 24, del'd Philadelphia .... 4.10c.
No. 24, f.o.b. Granite City .... 4.00c.
No. 24, f.o.b. Birmingham .... 3.95c.
No. 24, f.o.b. cars, dock, Pacific ports .....4.40c.
No. 24, wrought iron, Pittsburgh .....6.10c.

Electrical Sheets

(*F.o.b. Pittsburgh*)

Base per Lb.

Field grade .....3.35c.
Armature .....3.70c.
Electrical .....4.20c.
Special Motor .....5.10c.
Special Dynamo .....5.80c.
Transformer .....6.30c.
Transformer Special .....7.30c.
Transformer Extra Special....7.80c.

Base gage changed from 28 to 24 gage. Gage extras are the same as those applying on hot-rolled, annealed sheets with few exceptions.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh .....4.10c.
F.o.b. Gary .....4.20c.
F.o.b. cars, dock, Pacific ports 480c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh .....3.50c.
No. 20, f.o.b. Gary .....3.60c.
No. 20, f.o.b. Granite City ....3.70c.
No. 20, f.o.b. cars dock Pacific ports .....4.10c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh, per lb. .....3.30c.
No. 28, Gary .....3.40c.
No. 28, f.o.b. Granite City ....3.50c.
No. 28, cars dock Pacific ports, boxed .....4.175c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill.....$5.35
Standard cokes, f.o.b. Gary.... 5.45
Standard coke, f.o.b. Granite City 5.55

Special Coated Manufacturing Ternes

Base per Box

F.o.b. Pittsburgh $4.65
F.o.b. Gary 4.75
F.o.b. Granite City 4.85

Roofing Terne Plate

(*F.o.b. Pittsburgh*)

(Per Package, 112 sheets, 20 x 28 in.)

8-lb. coating I.C.....$12.00
15-lb. coating I.C..... 14.00
20-lb. coating I.C..... 15.00
25-lb. coating I.C..... 16.00
30-lb. coating I.C..... 17.25
40-lb. coating I.C..... 19.50

Hot-rolled Hoops, Bands, Strip and Flats under ¼ In.

Base per Lb.

All widths up to 24 in., Pittsburgh .....2.40c.
All widths up to 24 in., Chicago.2.50c.
All widths up to 24 in., del'd Detroit .....2.60c.
All widths up to 24 in., Granite City .....2.60c.
All widths up to 24 in., Birmingham .....2.55c.
Cooperage stock, Pittsburgh... 2.50c.
Cooperage stock, Chicago..... 2.60c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh .....3.20c.
F.o.b. Cleveland .....3.20c.
Del'd Chicago .....3.48c.
F.o.b. Worcester .....3.40c.

* Carbon 0.25 and less.

Cold Rolled Spring Steel

		Pittsburgh and Cleveland	Worcester
Carbon	0.25-0.50%	3.20c.	3.40c.
Carbon	.51- .75	4.45c.	4.65c.
Carbon	.76-1.00	6.30c.	6.50c.
Carbon	Over 1.00	8.50c.	8.70c.

Fender Stock

No. 14, Pittsb'gh or Cleveland. 3.45c.
No. 20, Pittsb'gh or Cleveland. 3.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

	Per Lb.
Bright wire	2.90c.
Galvanized wire	2.95c.
Spring wire	3.50c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.75
Smooth coated nails	$2.75
Cut nails, carloads	$3.60

	Base per 100 Lb.
Annealed fence wire	$3.15
Galvanized fence wire	3.55
Polished staples	3.45
Galvanized staples	3.70
Barbed wire, galvanized	3.40
Twisted barbless wire	3.40
Woven wire fence, base column.	.75
Single loop bale ties, base col.	.63

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh, except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton over Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	52	31	¼ & ⅜	+13	+35
¼ to ⅜	55	38½	½	20	1½
½	59½	49	¾	26	8
¾	62½	53	1 & 1¼	30	14
1 to 3	64½	55½	1½	34	16½
			2	33½	16

Lap Weld

2	57	47½	2	26½	10
2½ & 3	60	50½	2½ to 3½	27½	12½
3½ to 6	62	52½	4	29½	16
7 & 8	61	50½	4½ to 8	28½	15
9 & 10	60½	50	9 to 12	24½	10
11 & 12	59½	49			

Butt Weld, extra strong, plain ends

⅛	50½	36½	¼ & ⅜	+14	+48
¼ to ⅜	52½	40½	½	21	4
½	57½	48½	¾	27	10
¾	61½	52½	1 to 2	34	17½
1 to 3	63	55			

Lap Weld, extra strong, plain ends

2	55	46½	2	29½	13½
2½ & 3	59	50½	2½ to 4	35	20½
3½ to 6	62½	54	4½ to 6	33½	19
7 & 8	61½	51	7 & 8	34½	19½
9 & 10	60½	50	9 to 12	28	15½
11 & 12	59½	49			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.46	$ 8.41
1¼ in. o.d.	13 B.W.G.	11.21	9.96
1½ in. o.d.	13 B.W.G.	12.38	11.00
1¾ in. o.d.	13 B.W.G.	14.09	12.51
2 in. o.d.	13 B.W.G.	15.78	14.02
2¼ in. o.d.	13 B.W.G.	17.60	15.63
2½ in. o.d.	12 B.W.G.	19.37	17.21
2½ in. o.d.	12 B.W.G.	21.22	18.85
2¾ in. o.d.	12 B.W.G.	22.49	19.98
3 in. o.d.	12 B.W.G.	23.60	20.97
4½ in. o.d.	10 B.W.G.	45.19	40.15
3½ in. o.d.	11 B.W.G.	29.79	26.47
4 in. o.d.	10 B.W.G.	36.96	32.83
5 in. o.d.	9 B.W.G.	56.71	50.38
6 in. o.d.	7 B.W.G.	87.07	77.35

Extra for less-carload quantities:

40,000 lb.	or ft.	or over				Base
30,000 lb.	or ft.	to	39,999	lb.	or ft.	5%
20,000 lb.	or ft.	to	29,999	lb.	or ft.	10%
10,000 lb.	or ft.	to	19,999	lb.	or ft.	20%
5,000 lb.	or ft.	to	9,999	lb.	or ft.	30%
2,000 lb.	or ft.	to	4,999	lb.	or ft.	45%
Under 2,000 lb.	or ft.					65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$55.00
6-in. and larger, del'd New York	53.00
*6-in. and larger, Birmingham.	47.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	56.00
F.o.b. dock, Seattle	56.00
4-in. f.o.b. dock, San Francisco or Los Angeles	59.00
F.o.b. dock, Seattle	59.00

Class "A" and gas pipe, $3 extra
4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $46, Birmingham, and $54 delivered Chicago; and 4-in. pipe, $49, Birmingham, and $58 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. x 6 in. and smaller	65 and 5*
Larger and longer up to 1 in.	60 and 10*
1⅛ in. and larger	60 and 5*
Lag bolts	60 and 10*
Plow bolts, Nos. 1, 2, 3 and 7	65 and 5
Hot pressed nuts, and c.p.c. and t nuts, square or hex. blank or tapped:	
½ in. and smaller	65
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60

* Less carload lots and less than full container quantity. Less carload lots in full container quantity, an additional 10 per cent discount; carload lots and full container quantity, still another 5 per cent discount.

Semi-finished hexagon nuts, U.S.S. and S.A.E.:	
½ in. and smaller	60 and 10
9/16 in. to 1 in. inclusive	60 and 5
1⅛ in. and larger	60
Stove bolts in packages, nuts attached	70
Stove bolts in packages, with nuts separate	70 and 10
Stove bolts in bulk	80

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	$3.60
F.o.b. Chicago or Birmingham	3.70

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	65 and 5
F.o.b. Cleveland	65 and 5
F.o.b. Chicago and Birmingham	65 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more.)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $60 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	3.00c.
Delivered, Detroit	3.15c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	0.75
2300 (3½% Nickel)	1.55
2500 (5% nickel)	$2.25
3100 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4600 Nickel-molybdenum (0.20 to 0.30 Mo, 1.50 to 2.00 Ni)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
5100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel-vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2⅛ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.60c. base per lb. Delivered Detroit, 3.75c., carlots.

CORROSION & HEAT RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c	29c.	32.50c.	36.50c.
Hot strip	17c.	17.50c.	23c.	28c.
Cold stp.	22c.	22.50c.	28.50c.	36.50c.

TOOL STEEL

High speed	80c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	£20 Nominal
Tin plate, per base box	22s. 6d. to 23s.
Steel bars, open-hearth	£11
Beams, open-hearth	£11 2s. 6d.
Channels, open-hearth	£11 7s. 6d.
Angles, open-hearth	£11 2s. 6d.
Black sheets, No. 24 gage	£15
Galvanized sheets, No. 24 gage	£17 15s.

CONTINENTAL

Per Gross Ton, Gold £, f.o.b. Continental Ports

Billets, Thomas	£5 7s. 6d.
Wire rods, No. 5 B.W.G.	£6 10s.
Steel bars, merchant	£6
Sheet bars	£5 8s. 6d.
Plate ¼ in. and up	£7 7s.
Plate 3/16 in. and 5 mm.	£7 13s.
Sheet, ⅛ in.	£8 9s. 6d.
Beams, Thomas	£5 8s.
Angles (Basic)	£6 2s. 6d.
Hoops and strip, base	£6 10s.

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH*

Per Net Ton

Plates	3.70c.
Structural shapes	3.70c.
Soft-steel bars and small shapes	3.80c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock:	
Rounds and hexagons	4.15c.
Squares and flats	4.15c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	4.00c.
Hoops	4.50c.
Hot-rolled annealed sheets (No. 24), 10 or more bundles	4.50c.
Galv. sheets (No. 24), 10 or more bundles	5.15c.
Hot-rolled sheets (No. 10)	3.75c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$4.48
Spikes, large .....1 to 24 kegs	$3.75

Per Cent Off List

Track bolts, all sizes per 100 count	55
Machine bots, 100 count	**
Carriage bolts, 100 count	**
Nuts, all styles, 100 count	**
Large rivets, base per 100 lb.	$4.35
Wire, black, soft ann'l'd, base per 100 lb.	3.45c.
Wire, galv. soft, base per 100 lb.	3.85c.
Common wire nails, per keg	3.00c.
Cement coated nails, per keg	3.00c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 3999 lb.

* Delivered in Pittsburgh switching district.

** Prices on application.

CHICAGO *Base per Lb.*

Plates and structural shapes	3.75c.
Soft steel bars, rounds	3.85c.
Soft steel bars, squares and hexagons	4.00c.
Cold-fin. steel bars:	
Rounds and hexagons	4.30c.
Flats and squares	4.30c.
Hot-rolled strip	4.10c.
Hot-rolled annealed sheets (No. 24)	4.60c.
Galv. sheets (No. 24)	5.25c.
Spikes (keg lots)	$4.40
Track bolts (keg lots)	5.05
Rivets, structural (keg lots)	**4.95
Rivets, boiler (keg lots)	**5.05

Per Cent Off List

Machine bolts and carriage bolts, ½ in. and smaller	60
Lag screws	*55 and 5
Hot-pressed nuts, sq. and hex., tap or blank, ½ by 6 in. and smaller	60
Hex. head cap screws	60
Cut point set screws	75
Flat head bright wood screws	62 and 20
Spring cotters	45
Stove bolts in full packages	72½
Rd. hd. tank rivets, 7/16 in. and smaller	55
Wrought washers	$4.00 off list
Black ann'l'd wire per 100 lb. to mfg. trade (No. 14 and heavier)	$4.55
Com. wire nails, 15 kegs or more, per keg	$3.20
Cement c't'd nails, 15 kegs or more, per keg	$3.20

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

* These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

** Base at 100 lb.

NEW YORK

Base per Lb.

Plates, ¼ in. and heavier	4.00c.
Structural shapes	3.97c.
Soft steel bars, round	4.12c.
Iron bars, Swed. charcoal	7.25 to 7.50c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.57c.
Flats and squares	4.57c.
Cold-rolled; strip, soft and quarter hard	3.92c.
Hoops	4.32c.
Bands	4.32c.
Hot-rolled sheets (No. 10)	4.00 to 4.07c.
Hot-rolled ann'l'd sheets (No. 24*)	4.50 to 4.82c.
Galvanized sheets (No. 24*)	5.00c.
Long terne sheets (No. 24)	5.50 to 6.20c.
Armco iron, galv. (No. 24†)	6.25c.
Toncan iron, galv. (No. 24†)	6.25c.
Galvanneal (No. 24†)	6.50c.
Armco iron, hot-rolled annealed (No. 24†)	5.65c.
Toncan iron, hot-rolled annealed (No. 24†)	5.65c.
Armco iron hot-rolled (No. 10†)	4.60c.
Toncan iron, hot-rolled (No. 10†)	4.60c.
Cold-rolled sheets (No. 20) for quantities 400 to 1499 lb.	
Standard quality	5.40c.
Deep drawing	6.05c.
Stretcher leveled	6.05c.
SAE, 2300, hot-rolled	7.82c.
SAE, 3100, hot-rolled	6.37c.
SAE, 6100, hot-rolled, annealed	10.52c.
SAE, 2300, cold-rolled	9.00c.
SAE, 3100, cold-rolled, annealed	8.55c.
Floor plate, ⅛ in. and heavier	5.60c.
Standard tool steel	12.50c.
Wire, black, annealed (No. 9)	4.65c.
Wire, galv. (No. 9)	5.00c.
Tire steel, 1 x ½ in. and larger	4.61c.
Open-hearth spring steel	4.75c. to 10.25c.
Common wire nails, base per keg	3.25c.

Per Cent Off List

Machine bolts, square head and nut: All diameters. Prices on application	
Carriage bolts, cut thread: All diameters. Prices on application	

* For 1500 lb. or more; add 0.25c. on smaller lots. No. 28 and lighter, 36 in. wide, 20c. per 100 lb. higher.

ST. LOUIS

Base per Lb.

Plates and struc. shapes	3.99c.
Bars, soft steel (rounds and flats)	4.09c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	4.24c.
Cold-fin. rounds, shafting, screw stock	4.54c.
Hot-rolled annealed sheets (No. 24)	4.84c.
Galv. sheets (No. 24*)	5.49c.
Hot-rolled sheets (No. 10)	4.09c.
Black corrug. sheets (No. 24*)	4.89c.
2 galv. corrug. sheets	5.54c.
Structural rivets	5.29c.
Boiler rivets	5.39c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller	50
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, nuts; all quantities	60

* No. 26 and lighter take special prices.

PHILADELPHIA

Base per Lb.

*Plates, ¼-in. and heavier	3.90c.
*Structural shapes	3.90c.
*Soft steel bars, small shapes, iron bars (except bands)	4.00c.
‡Reinforc. steel bars, square and deformed	3.53c.
Cold-finished steel bars	4.53c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	4.10c.
*Spring steel	5.50c.
†Hot-rolled anneal. sheets (No. 24)	4.65c.
†Galvanized sheets (No. 24)	5.30c.
*Hot-rolled annealed sheets (No. 10)	4.00c.
*Diam. pat. floor plates, ¼ in.	5.25c.

These prices are for delivery in Philadelphia trucking area.

* Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

‡ For less than 2000 lb.

CLEVELAND

Base per Lb.

Plates and struc. shapes	3.86c.
Soft steel bars	3.75c.
†Reinforc. steel bars	2.50c.
‡Cold-finished steel bars	4.30c.
Hot-rolled strip, 6 in. wide and under	4.16c.
Cold-finished strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.66c.
Galvanized sheets (No. 24)	5.31c.
Hot-rolled sheets (No. 10)	3.91c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.91c.
Floor plates, 3/16 in. and heavier	5.76c.
*Black ann'l'd wire, per 100 lb.	$3.40
*No. 9 galv. wire, per 100 lb.	3.80
*Com. wire nails, base per keg	2.95

Per Cent Off List

Machine and carriage bolts, small	65 and 5
Large	60 and 10
Nuts, 100 count ½ in. and smaller	65 and 5
9/16 in. to 1 in.	60 and 10

† Outside delivery 10c. less.

* For 5000 lb. or less.

‡ Plus switching and carriage charges and quantity differentials up to 50c.

CINCINNATI

Base per Lb.

Plates and struc. shapes	3.95c.
Floor plates	5.55c.
Bars, rounds, flats and angles	4.05c.
Other shapes	4.20c.
Rail steel reinforc. bars	3.75
Hoops and bands, 3/16 in. and lighter	4.25c.
Cold-finished bars	4.50c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.60c.
Galv. sheets (No. 24) 3500 lb. or more	$5.25
Hot-rolled sheets (No. 10)	4.00c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$3.48
Com. wire nails, base per keg: Any quantity less than carload	3.20
Cement c't'd nails, base 100-lb. keg.	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes, 2-in.	$21.80
4-in.	52.45
Lap-welded steel boiler tubes. 2-in.	20-73
4-in.	48.41

BUFFALO *Base per Lb.*

Plates	3.92c.
Floor plates	5.52c.
Struc. shapes	3.80c.
Soft steel bars	3.90c.
Reinforcing bars	3.10c.
Cold-fin. flats and sq. Rounds and hex.	4.35c. 4.35c.
Cold-rolled strip steel	3.79c.
Hot-rolled annealed sheets (No. 24)	4.80c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.97c.
Galv. sheet (No. 24)	5.45c.
Bands	4.22c.
Hoops	4.22c.
Heavy hot-rolled sheets	3.97c.
Com. wire nails, base per keg	$3.26
Black wire, base per 100 lb. (2500-lb. lots or under)	4.55c.
(Over 2500 lb.)	4.45c.

BOSTON *Base per Lb.*

Channels, angles	4.20c.
Tees and zees, under 3 in.	4.45c.
H beams and shapes	4.07c.
Plates — Sheared, tank and univ. mill, ¼ thick and heavier	4.08c.
Floor plates, diamond pattern	5.13c.
Bar and bar shapes (mild steel)	4.20c.
Bands 3/16 in. thick and No. 12 ga. incl.	4.40 to 5.40
Half rounds, half ovals, ovals and bevels	5.45c.
Tire steel	5.45c.
Cold-rolled strip steel	3.845c.
Cold-finished rounds, squares and hexagons	4.65c.
Cold-finished flats	4.65c.
Blue annealed sheets, No. 10 ga.	3.90c.
One pass cold-rolled sheets No. 24 ga.	4.50c.
Galvanized steel sheets, No. 24 ga.	5.05c.
Lead coated sheets, No. 24 ga.	6.15c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.49c.
Structural shapes	3.95c.
Plates	3.95c.
Floor plates	5.85c.
Hot-rolled annealed sheets (No. 24)*	4.69c.
Hot-rolled sheets (No. 10)	3.94c.
Galvanized sheets (No. 24)*	5.40c.
Bands and hoops	4.19c.
Cold-finished bars	4.30c.
Cold-rolled strip	3.78c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	6.44c.

Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot-rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.

*Under 400 lb., .50c. over base, 400 to 1499 lb., base; 1500 to 3499 lb., base less .10c.; 3500 lb. and over, base less .15c.

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.86c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.96c.
Soft steel bars, squares and hexagons	4.11c.
Hot-rolled strip	4.21c.
Hot-rolled annealed sheets (No. 24)	4.71c.
Galvanized sheets (No. 24)	5.36c.
Cold-finished steel bars	4.41c.
Structural rivets (keg lots)	5.16c.
Boiler rivets, cone head (keg lots)	5.26c.
Track spikes (keg lots)	4.61c.
Track bolts (keg lots)	5.81c.
Black annealed wire (No. 6 to No. 9 incl.)	4.05c.
Com. wire nails and cement coated nails 1 to 14 kegs	3.25c.

	Per Cent Off List
Machine bolts and carriage bolts, ½x6 and smaller or shorter	65
Larger and longer up to 1 in., diam.	60–5
1⅛ in. and larger	60
Coach and lag screws	60–5
Hot-pressed nuts, sq. and hex. tapped or blank, 1–199 lb.	50
200 lb. and over:	
½ in. and smaller	62½
9/16 to 1 in.	60
1⅛ in. and over	50

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.55c.
Hot-rolled annealed sheets, No. 24	4.85c.
Galvanized sheets, No. 24	5.50c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BIRMINGHAM

Bars and bar shapes	$3.85 base	
Structural shapes and plates	3.75	"
Hot rolled sheets No. 10 ga.	3.80	"
Hot rolled sheets No. 24 ga.	4.40	" 3500 lb. and over
Galvanized sheets No. 24 ga.	5.05	" 3500 lb. or more
Strip	4.05	"
Reinforcing bars	3.85	"
Floor plates	5.96	"
Cold finished bars	4.91	"
Machine and carriage bolts	.50 & 10 off list	
Rivets (structural)	$4.60 base	

On plates, shapes, bars, hot rolled strip, heavy hot rolled sheets, the base applies on 400 to 3999 lb. All prices are f.o.b. consumer's plant.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	4.00c.
Structural shapes	3.90c.
Reinforcing bars, 5 to 15 tons	3.16c.
Plates	3.90c.
Hot-rolled sheets, No. 10	3.95c.
Bands	4.20c.
Hoops	4.45c.
Special threading steel	4.15c.
Checkered floor plates ¼ in. and heavier	5.50c.
Galvanized sheets, No. 24, 100 bdls. or more	$4.70
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	$4.50

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets the base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers' plants.

For second zone add 10c. per 100 lb. for trucking.

CHATTANOOGA

	Base per Lb.
Mild steel bars	4.21c.
Iron bars	4.21c.
Reinforcing bars	4.21c.
Reinforcing shapes	4.11c.
Plates	4.11c.
Hot-rolled sheets No. 10	4.16c.
Hot-rolled annealed sheets, No. 24*	4.06c.
Galvanized sheets No. 24*	4.76c.
Steel bands	4.41c.
Cold-finished bars	4.86c.

---

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	4.31c.
Shapes, bar size	4.31c.
Iron bars	4.31c.
Structural shapes	4.21c.
Plates	4.21c.
Hot-rolled sheets, No. 10	4.26c.
Hot-rolled annealed sheets, No. 24	4.91c.
Galvanized sheets, No. 24	5.66c.
Steel bands	4.56c.
Cold-drawn rounds	4.80c.
Cold-drawn flats, squares, hexagons	6.80c.
Structural rivets	5.15c.
Bolts and nuts, per cent off list	55
Small rivets, per cent off list	55

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	$3.55
Bolts and nuts, per cent off list	60

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	4.05c.	4.30c.	4.25c.
Shapes, standard	4.05c.	4.30c.	4.25c.
Soft steel bars	4.20c.	4.30c.	4.45c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.975c.	2.975c.	2.975c.
Hot-rolled annealed sheets (No. 24)	5.15c.	5.05c.	5.35c.
Hot-rolled sheets (No. 10)	4.30c.	4.50c.	4.50c.
Galv. sheets (No. 24 and lighter)	5.85c.	5.55c.	5.90c.
Galv. sheets (No. 22 and heavier)	6.10c.	5.70c.	5.90c.
Cold-finished steel Rounds	6.80c.	6.85c.	7.10c.
Squares and hexagons	8.05c.	8.10c.	7.10c.
Flats	8.55c.	8.60c.	8.10c.
Common wire nails—base per keg less carload	$3.40	$3.40	$3.40

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$54.00
First quality, New Jersey	56.00
Select, Ohio	49.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	49.00
Second quality, New Jersey	51.00
No. 1, Ohio	46.00
Ground fire clay, per ton	8.00

5 per cent trade discount on fire clay brick, except for New Jersey, quoted at net price.

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$54.00
Chicago District	63.00
Birmingham	54.00
Silica cement per net ton (Eastern)	9.50

5 per cent trade discount on silica brick.

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$49.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	49.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester	$69.00
Chemically bonded, f.o.b. Baltimore	59.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash	25.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$25.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	25.00
Delivered Brooklyn	27.47
Delivered Newark or Jersey City	26.53
Delivered Philadelphia	25.84
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo, Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	24.00
F.o.b. Jackson, Ohio	25.75
Delivered Cincinnati	24.27
F.o.b. Duluth	24.50
F.o.b. Provo, Utah	22.00
Delivered San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	20.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 5c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$25.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	24.50
F.o.b. Buffalo	23.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	23.50
Delivered Cincinnati	24.61
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44
F.o.b. Jackson, Ohio	25.50
F.o.b. Birmingham	19.00

Bessemer

F.o.b. Everett, Mass.	$26.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	26.00
Delivered Boston Switching District	26.50
Delivered Newark or Jersey City	27.53
Delivered Philadelphia	26.76
F.o.b. Buffalo and Erie, Pa., and Duluth	25.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	24.50
F.o.b. Birmingham	25.00
Delivered Cincinnati	25.61
Delivered Canton, Ohio	25.89
Delivered Mansfield, Ohio	26.44

Low Phosphorus

Basing points: Birdsboro, Pa. Steelton, Pa., and Standish, N. Y.	$28.50

Gray Forge

Valley or Pittsburgh furnace	$23.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.24

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$26.50
No. 2 fdy., sil. 1.75 to 2.25	25.50
Malleable	26.00
Basic	25.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$27.50
No. 2 fdy., sil. 1.75 to 2.25	27.00
Malleable	27.50
Basic	27.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$102.50

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$33.00
F.o.b. New Orleans	33.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	80.50
75% (carloads)	126.00
75% (ton lots)	139.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50%	$27.50

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$33.50
10.51 to 11.00%	34.00
11.01 to 11.50%	34.50
11.51 to 12.00%	35.00
12.01 to 12.50%	35.50
12.51 to 13.00%	36.00
13.01 to 13.50%	36.50
13.51 to 14.00%	37.00
14.01 to 14.50%	37.50
14.51 to 15.00%	38.00
15.01 to 15.50%	38.50
15.51 to 16.00%	39.00
16.01 to 16.50%	39.50
16.51 to 17.00%	40.00

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads, nominally	$1.80
Ferrotungsten, lots of 500 lbs., nominally	1.85
Ferrotungsten, smaller lots, nominally	1.90
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads and contract	10.50c.*
Ferrochromium, 2% carbon, carlots	16.50c.*
Ferrochromium, 1% carbon, carlots	17.50c.*
Ferrochromium, 0.10% carbon, carlots	19.50c.*
Ferrochromium, 0.06% carbon, carlots	20.00c.*
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., with gross ton	63.50
Ferrophosphorus, electrolytic, 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	80.00
Ferromolybdenum, per lb. Mo. del	95c.
Calcium molybdate, per lb. Mo del	80c.
Silico spiegel, per gross ton, f.o.b. furnace, carloads	$45.00
Ton lots or less, per ton	50.00
Silico-manganese, gross ton, delivered.	
3%	101.50
2.50% carbon grade	106.50
2% carbon grade	111.50
1% carbon grade	121.50

* Spot prices are $5 a ton higher

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$5.25
Old range, non-Bessemer, 51.50%	5.10
Mesabi, Bessemer, 51.50%	5.10
Mesabi, non-Bessemer, 51.50%	$4.95
High phosphorus, 51.50%	4.85

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry, Algeria, nominal	17.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	Nominal
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	50c.
Man., African, Indian, 44-48%	Nominal
Man., African, Indian, 49-51%	Nominal
Man., Brazilian, 46 to 48½%	Nominal

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered	$24.50
Tungsten, domestic, scheelite delivered	$23.50 to $25.50
Chrome ore (lump) c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	$16.00
Rhodesian, 45%	22.00
Rhodesian, 48%	25.50
Turkish, 48-49%	25.00 to $26.00
Turkish, 45-46%	23.00 to 23.50
Turkish, 44%	19.00 to 19.50
Chrome concentrates (Turkish) c.i.f. Atlantic Seaboard, per gross ton:	
50%	$25.50 to $26.50
48-49%	24.50 to 25.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$20.00
Domestic, barge and rail	21.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	22.00
Foreign, 85% calcium, fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	24.50
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.50

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore, No. 3 distillate	5.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	5.25c.
Del'd Ch'go, No. 3 industrial	4.15c.
Del'd Ch'go, No. 5 industrial	4.00c.
Del'd Cleve'd, No. 3 distillate	5.875c.
Del'd Cleve'd, No. 4 industrial	5.75c.
Del'd Cleve'd, No. 5 industrial	4.625c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt	5.00 to 6.25
Foundry, by-product, Chicago ovens	10.25
Foundry, by-product, del'd New England	12.50
Foundry, by-product, del'd Newark or Jersey City	10.88 to 11.40
Foundry, by-product, Philadelphia	10.95
Foundry, by-product, delivered Cleveland	11.05
Foundry, by-product, delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product, del'd St. Louis industrial district	11.00 to 11.50
Foundry, from Birmingham, f.o.b. cars dock, Pacific ports	14.75

FABRICATED STEEL

. . . Lettings in smaller volume at 9710 tons as against 12,100 tons last week.

o o o

. . . New projects decline to 9400 tons from 10,325 tons a week ago.

o o o

. . . Plate awards call for 1500 tons.

NORTH ATLANTIC STATES

Norwich, Conn., 350 tons, Shetucket River bridge, to Harris Structural Steel Co., Plainfield, N. J.

Boston, 270 tons, Pratt Diagnostic hospital unit, to A. O. Wilson Structural Co., Boston.

New York, 160 tons, boiler house extension Jacob Rupert Brewery, to American Bridge Co., Pittsburgh.

New York, 185 tons, coal bunker, 93rd Street and Third Avenue, to Post & McCord, New York.

Caledonia, N. Y., 180 tons, addition to grade and high school, to F. L. Heughes & Co., Rochester, N. Y.

Philadelphia, 125 tons, U. S. Gypsum Co. building addition, to Robinson Iron & Steel Co., Philadelphia.

Elizabethtown, Pa., 195 tons, hospital addition, to Lehigh Structural Steel Co., Allentown, Pa.

East Penn, Pa., 395 tons, industrial building, to Belmont Iron Works, Philadelphia.

Pittsburgh, 450 tons, building for Coca Cola Bottling Co., to Bethlehem Steel Co., Bethlehem, Pa.

Washington, 105 tons, Carnegie Institute administration building, to Barber & Ross, Washington.

THE SOUTH

Port Royal, S. C., 380 tons, bridge to Vincennes Bridge Co., Vincennes, Ind.

Baton Rouge, La., 345 tons, extension to Louisiana Steam Generating Corp. building, to Virginia Bridge Co., Roanoke, Va.

Galveston, Tex., 475 tons, bascule bridge, to Wisconsin Bridge & Iron Co., Milwaukee.

CENTRAL STATES

Bay City, Mich., 1100 tons, Lafayette Avenue Bridge, to R. C. Mahon Co., Detroit.

State of Michigan, 155 tons, railroad bridge, to American Bridge Co., Pittsburgh.

Richland County, Ohio, 160 tons, bridge, to Mount Vernon Bridge Co., Mount Vernon, Ohio.

Butlerville, Ind., 125 tons, dormitories, to Art Iron & Wire Works, Inc., Toledo, Ohio.

Peoria, Ill., 210 tons, Mohammed Temple, to Mississippi Valley Structural Steel Co., St. Louis.

Peebles, Ohio, 260 tons, State highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

WESTERN STATES

Wahkiakum County, Wash., 220 tons, Grays River State highway bridge, to Poole & McGonigle, Inc., Portland, Ore.

Los Angeles, 235 tons, Pacific Electric Co. main line bridge for United States Engineer, to Wisconsin Bridge & Iron Co., Milwaukee.

Oakland, Cal., 950 tons, Owens-Illinois Glass Co. warehouse, to Moore Dry Dock Co., Oakland.

Los Angeles, 1050 tons, tunnel ribs for Department of Water and Power, to Bethlehem Steel Co., San Francisco.

Mare Island, Cal., 1500 tons, cofferdam, to Moore Dry Dock Co., Oakland, Cal.

Mare Island, Cal., 150 tons, miscellaneous iron and steel for drydock, to unnamed bidders; Pacific Bridge Co., San Francisco, general contractor.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Framingham, Mass., 200 tons, Marist Fathers house.

Sprinfield, Mass., 200 tons, S. S. Kresge Co. store.

Cambridge, Mass., 135 tons, city sanatorium.

New York, 700 tons, Tallman's Island sewage works.

Flushing, N. Y., 350 tons, substructure, New York World's Fair Building.

Mineola, N. Y., 350 tons, office building extension Long Island Lighting Co.

Erie County, N. Y., 170 tons, State bridge.

Montgomery County, N. Y., 100 tons, State, highway bridge.

Pittsburgh, 110 tons, religious school, Rodef Sholom Congregation.

Reading, Pa., 140 tons, storage cellar, Old Reading Brewery.

Baltimore, 120 tons, library building, Morgan College.

THE SOUTH

Charleston, W. Va., 1000 tons, Kanawha Boulevard bridge.

Holdenville, Okla., 200 tons, gin building and seed house.

Clarksdale, Ariz., 255 tons, bridge.

Flagstaff, Ariz., 250 tons, bridge.

CENTRAL STATES

Detroit, 2300 tons, building for sludge filter incinerator.

Asheville, Ohio, 350 tons, court house.

Lawrence, Kan., 230 tons, power station, Kansas Electric & Power Co.

State of Missouri, 1700 tons: 900 tons for repairs to a highway bridge across Missouri River at St. Charles, and 600 tons for a bridge at Moberly.

WESTERN STATES

Los Angeles, 149 tons, Opechee Way and Wabasso Way bridges for United States Engineer; Bethlehem Steel Co., low bidder.

Los Angeles, 105 tons, Lower Canada Boulevard bridge for United States Engineer; bids opened.

Brownsville, Ore., 105 tons, Calapooya River highway bridge; bids Jan. 7.

Columbia County, Ore., 100 tons, Mile bridge; bids Jan. 7.

Seattle, 300 tons, Naval Reserve hangar.

FABRICATED PLATES

AWARDS

St. Louis, 1500 tons; six barges, 1300 tons, and a diesel twin-screw barge, 200 tons, for Socony-Vacuum Oil Co., to an unnamed bidder.

SHEET PILING

AWARDS

Mare Island, Cal., 1825 tons, drydock, to Bethlehem Steel Co.; Pacific Bridge Co., San Francisco, general contractor.

Empire Sheet To Make Improvements

AN improvement program to increase its sheet producing facilities has been announced by Empire Sheet & Tin Plate Co., Mansfield, Ohio.

The program includes installation of a mechanized unit of three mills and three heating furnaces, together with auxiliary equipment.

Pickets Sentenced In Blocking Of Mails

A FINAL chapter in efforts of the SWOC to prevent mail deliveries in plants of the Republic Steel Corp. and the Youngstown Sheet & Tube Co., during the strike early in the summer, was written in the Federal Court in Cleveland, Dec. 21, when three SWOC leaders and six pickets were given prison sentences by Federal Judge Paul Jones after they had pleaded guilty to charges of obstructing the mails by interfering with deliveries to the plants of the two steel companies.

THIS WEEK'S MACHINE . . .TOOL ACTIVITIES. . .

. . . Year-end dullness prevalent in most markets.

° ° °

. . . Foreign orders, principally Russian, chief business.

° ° °

. . . Good pick-up expected before end of first quarter.

Greater Activity Expected At Cleveland in January

CLEVELAND—Machine tool bookings and inquiries have slackened further owing to the holiday season. Numerous plants are closed, a few planning to remain shut down until about the middle of January. While it is difficult to estimate at this time the extent of activity in January, it is generally felt that improvement can be counted upon. Some plants in outlying sections report that an increase in orders is in prospect after the turn of the year. Outside of a few inquiries for odd machines, greatest interest centers upon the Ford Motor Co.'s requirements for its new body stamping plant and tool and die room. Ford has been accepting quotations on the necessary equipment. Foreign orders in fair volume have supplied most of the impetus so far this month.

Inquiries Show Gain At Pittsburgh

PITTSBURGH — Dealers are especially busy cleaning up year-end items. Orders show little change from recent activity, but inquiries continue to show signs of strength. December business will be less than the volume of November orders. Steel mill equipment manufacturers still have a considerable backlog, and recent export orders indicate no letdown in present activity for some time to come.

New York Tool Market Ends Year in Dullness

NEW YORK—Unlike last year, the tail end of 1937 is extremely quiet, with new orders almost completely absent. Dealers that ordinarily do a fair volume of business reported one order or none last week, and expect to find the current week no better. Only in small auxiliary equipment is there any activity, with one notable exception. A leading manufacturer has staked his faith in the future to the extent of ordering three large size jig borers to expand toolroom facilities. Otherwise a feeling of uncertainty in the future seems to stay manufacturing executives from making further commitments for machinery. Opinion is divided as to what the next month's business may be. Quotations are being made freely, but some believe that unsettling news from Washington is tending to prevent inquiries from developing into orders.

Amtorg continues to be the focal point of foreign sources of orders.

Chicago Has Fair Volume of Machine Tool Inquiries

CHICAGO — Machine tool sales offices in this district did little business in the past week, but inquiries were in fair volume. Indications are that metalworking industries are figuring on fairly large purchases toward the end of the first quarter of 1938. One interest reports its appraisal of the current recession is that it is largely one of inventory - adjustment. Meanwhile, however, these trades are buying as little as possible. One seller reports that business so far in December has been on about a par with that in the corresponding period in November. The equipment trade continues to assert that relief from the surtax on undistributed profits would enable many manufacturers to release substantial orders for greatly needed equipment.

Foreign Buying Eases Downturn at Cincinnati

CINCINNATI—A moderate easing of machinery demand was noted in this area the past week. Domestic business is sharply off, but continued good ordering from European and far Eastern users tends to ease the downward swing of home demand. Smaller tools, particularly lathes, are most active in current business. Inquiry continues to be active. The trade feels that the current recession in domestic business is temporary, with reasonable assurance that the new year will bring improvement.

Production is being held at about 60 per cent of capacity. Most manufacturers still have good backlogs, in many instances in sufficient amount to hold present schedules intact well into the first quarter.

Plant Shutdowns Check Detroit Machinery Trade

DETROIT — Layoffs in automobile plants and close-downs for early January, plus considerable reduction in automobile office staffs, has thrown a discouraging note into the machinery market, although most machinery sales offices are still figuring on new plant equipment for 1939 models. Placing of small orders immediately after the first of the year is looked forward to as a possible indicator of the attitude of automobile companies.

Tool Engineers Plan Exhibit at Detroit

IN connection with the annual meeting of the American Society of Tool Engineers, to be held in Detroit, March 9 to 12, there is planned a "Machine and Tool Progress Exhibition." Arrangements have been made to hold this exhibit at Convention Hall, and already a fair amount of space has been contracted for.

The society now has 14 chapters scattered from Milwaukee to Hartford, Conn., and this is the first annual meeting at which an exhibit will be held and technical papers presented. Past meetings have heretofore dealt only with internal problems of the growing society. Ford R. Lamb is executive secretary, with headquarters at 5928 Second Boulevard, Detroit.

Ajax Mfg. Co. Wins Decision In Patent Litigation

THE United States Sixth Circuit Court of Appeals has recently reversed the decision of Judge West of the District Court of the United States for the Northern district of Ohio by deciding in favor of the Ajax Mfg. Co., Cleveland, in the patent infringement suit which was brought against the Ajax company by the National Machinery Co., Tiffin, Ohio. The suit was upon United States patents Nos. 1,297,101 and 1,683,956 covering respectively header slide and die slide construction on forging machines. Both patents were held invalid by the Court of Appeals.

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

American Agricultural Chemical Co., 50 Church Street, New York, plans one-story factory branch, storage and distributing plant at Syracuse, N. Y. Cost close to $60,000 with equipment.

J. C. Machine Works, 29-05 Fortieth Road, Long Island City, manufacturer of machinery and parts, has leased one-story adjoining building, 25 x 100 ft., for expansion.

Owens-Illinois Can Co., Boston and Linwood Avenues, Baltimore, a subsidiary of Owens-Illinois Glass Co., Toledo, Ohio, has leased a floor in building at 150 Bay Street, Jersey City, N. J., for new factory branch, storage and distributing plant for metropolitan area. New York offices are at 405 Lexington Avenue.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for one electric arc welding set and spare parts (Schedule 2367); until Jan. 18, ventilation equipment and spare parts (Schedule 2358) for Brooklyn Navy Yard; until Jan. 4, aluminum chairs (Schedule 2351) for Brooklyn and Mare Island yards.

Kramer Body & Equipment Corp., 549 West Thirty-ninth Street, New York, manufacturer of automobile bodies and equipment, has leased two-story industrial building, 50 x 100 ft., at 14-16 West End Avenue, for plant, removing present works to new location and increasing capacity.

Magnus Metal Corp., 111 Broadway, New York, affiliated with National Lead Co., same address, will soon begin superstructure for new one-story foundry at Colonie, N. Y., for which general contract recently was let to Austin Co., Cleveland. Cost over $60,000 with equipment.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Jan. 10 for marker beacons, mountings, capacitors, etc. (Circular 89).

Schieffelin & Co., 16-26 Cooper Square, New York, drugs and chemicals, have purchased 10-story building on adjoining site, totaling over 60,000 sq. ft. of floor space, for expansion.

Board of Education, Union Free School District No. 1, Bay Shore, L. I., plans manual training department in new three-story and basement high school at Third Avenue and Perkal Street, for which bids have been asked on general contract. Cost close to $800,000. William I. LaFond, Jr., Bay Shore, is architect.

John Simmons Co., 47-09 Thirtieth Street, Long Island City, New York, manufacturer of steamfitting and plumbing equipment, has purchased an entire block of property, 200 x 310 ft., bounded by Forty-eighth and Hunterspoint Avenues, Thirty-first Street and Thirty-first Place, Long Island City, for new one-story machine shop and pipe works, latter to include extensive storage and distributing departments. Cost over $200,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Jan. 10 for 168 aluminum fin assemblies for 600-lb. demolition bombs (aluminum fabrication) (Circular 441), 168 assemblies of finished forged steel parts for 600-lb. demolition bombs (Circular 444).

Kuchar Brothers, Magnolia Avenue, Montvale, N. J., bridge, reservoir and other heavy construction contractors, have acquired adjoining property for expansion in maintenance, storage and distributing plant for construction equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 18 for turbo-generator and diesel engine-driven generator sets, including spare parts, tools, wrenches, etc. (Schedule 2398) for Philadelphia and Brooklyn Navy yards.

United States Gypsum Co., Fifty-eighth Street and Schuylkill Avenue, Philadelphia, with main offices at Chicago, plans one and two-story and basement addition to local mill, 20 x 175 ft., with one-story wing extension, 20 x 120 ft., primarily for storage and distribution. Cost over $80,000 with equipment.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Jan. 5 for reworking bullets, lead, nickel, etc., into 90,000 lb. of lead antimony alloy, and reworking 330,000 lb. of lead scrap into lead antimony alloy (Circular 540).

BUFFALO DISTRICT

National Gypsum Co., 190 Delaware Avenue, Buffalo, building products, wall board, etc., has let structural steel contract to Rogers Structural Steel Co., Corry, Pa., for new mill on waterfront at Mobile, Ala., for which superstructure will begin early in 1938. Cost close to $1,000,000 with equipment. H. K. Ferguson Co., Hanna Building, Cleveland, is general contractor.

Wickwire Spencer Steel Co., River Road, Tonawanda, N. Y., has approved plans for one-story addition. Cost about $45,000 with equipment. Main offices are at New York.

NEW ENGLAND

General Electric Co., Pittsfield, Mass., has let general contract to Lindholm Construction Co., Inc., 24 North Street, for one-story and basement addition, 80 x 500 ft. Cost over $200,000 with equipment. Main offices of company are at Schenectady, N. Y.

Board of Selectmen, Thomaston, Conn., plans manual training department in new two-story and basement high school. Bids recently asked have been rejected and new bids on general contract will be asked soon. Cost about $200,000. Towner & Sellew Associates, Inc., 164 Court Street, Middletown, Conn., is architect.

A. C. Gilbert Co., Blatchley Avenue, New Haven, Conn., manufacturer of electric motors, fans, heaters and other electrical products, has let general contract to Mott-Mohr Construction Co., 440 Elm Street, for three-story and basement addition, 53 x 160 ft. Cost over $100,000 with equipment. Westcott & Mapes, Inc., New Haven, is architect and engineer.

Cremo Brewing Co., Belden Street, New Britain, Conn., has asked bids on general contract for one-story mechanical-bottling works, 120 x 140 ft. Cost close to $80,000 with machinery. Bids for other extensions, including a four-story brew-house unit, will be asked soon. Edward F. Kawiak is company engineer.

WASHINGTON DIST.

United States Coast Guard Headquarters, Washington, asks bids until Jan. 3 for one to four 10-kw. electric generating sets (Proposal CG-3427).

Baltimore Pure Rye Distillery, Inc., Dundalk, Md., has let general contract to Engineering-Contracting Corp., North and Linden Avenues, Baltimore, for two-story addition, 32 x 75 ft., for expansion in mechanical-bottling division. Cost close to $60,000 with machinery.

General Purchasing Officer, Panama Canal, Washington, asks bids until Jan. 3 for one pipe-cutting and threading machine, motor-driven, 2½ to 12-in., complete with spare dies; also for similar pipe-cutting and threading machines to handle pipe sizes as follows: 4 to 12-in.; two 2½ to 8-in.; 1 to 4-in.; and ½ to 2-in. (Schedule 3310).

C. C. Lang & Son, 725 North Haven Street, Baltimore, food packers, plan two-story addition, for which bids will be asked soon on general contract. Cost about $50,000 with equipment.

City Council, Hagerstown, Md., asks bids until Jan. 6 for extensions and improvements in municipal electric power plant, including new generator unit and auxiliary equipment. Cost close to $200,000 with equipment. Wood & Kirkpatrick, Stock Exchange Building, Philadelphia, are consulting engineers; Joseph I. Lyon is city engineer.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for one universal tool and cutter grinder, motor-driven (Schedule 2374), one motor-driven thread-grinding machine (Schedule 2380) for Alexandria, Va.; 560,000 lin. ft. of plow steel wire rope (Schedule 2361) for Yorktown, Va., yard; five sets of tank level indicating systems (Schedule 2362), three distant-reading tank gages (Schedule 2364) for Portsmouth and Mare Island yards; galvanized steel expanded metal (Schedule 2358); until Jan. 7, ejectors (Schedule 2228) for Eastern and Western yards; parts for airplanes (Schedule 900-1328) for White Plains Station; parts for airplanes (Schedule 900-1326) for Sewall's Point, Va., yard.

SOUTH ATLANTIC

Greensboro Pepsi-Cola Bottling Co., Greensboro, N. C., has acquired a one-story building at 106 Pearson Street, and will remodel for new mechanical-bottling plant. Cost close to $40,000 with equipment.

West Florida Electric Co-Operative Association, Inc., Graceville, Fla., A. J. Crutchfield, president, plans new steam-electric power plant for power supply for rural electrification system to be built in part of Jackson County. Entire project will cost about $130,000. Financing has been arranged through Federal aid.

Bay Concrete Co., Port St. Joe, Fla., has acquired property on East Fourth Street for new one-story plant for manufacture of cast concrete blocks, bricks and similar specialties. Cost about $40,000 with machinery.

SOUTH CENTRAL

Board of Administrators, Charity Hospital of Louisiana, Nw Orleans, Fred W. Matthews, secretary, asks bids until Jan. 4 for auxiliary buildings at new institution, including metal-working and woodworking shops, equipment storage and distributing building, power house and refrigerating plant. Weiss, Dreyfous & Seiferth, Maison Blanche Building, are architects.

Montgomery Oak Flooring Co., North Montgomery, Ala., plans rebuilding of portion of mill and power house recently destroyed by fire. Loss close to $100,000 with machinery.

Southwestern Gas & Electric Co., Travers Street, Shreveport, La., is arranging fund of $3,250,000 for expansion and improvements in power plants and system, including addition to steam-electric generating station at Arsenal Hill and new steam turbo-generating unit and auxiliary equipment; extensions in transmission and distributing lines, power substations, switching stations and other structures.

New South Oil Mill Co., Helena, Ark., manufacturer of cottonseed oil products, has approved plans for one-story addition, 100 x 160 ft., in part for new cake-grinding and processing unit, and for seed house. Cost over $65,000 with equipment.

Air Reduction Sales Co., 1256 Logan Street, Louisville, industrial oxygen, welding apparatus, etc., has filed plans for one-story addition, for which superstructure will begin at once.

SOUTHWEST

Warren Petroleum Co., National Bank of Tulsa Building, Tulsa, Okla., has plans for new natural gasoline plant at Aransas Pass, Tex., where large tract has been acquired, with compressor station and steel tank storage facilities. Cost close to $125,000 with machinery.

Kansas Electric Power Co., Lawrence,

Kan., has asked bids on general contract for new power plant at Cameron Bluff, near city, equipment to include 10,000-kw. turbo-generator, high-pressure boilers and auxiliary equipment. Cost about $1,000,000 with machinery. Extensions also will be made in transmission lines. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

Perry Coal Co., O'Fallon, Mo., has approved plans for expansion in St. Ellen coal-mining properties, near O'Fallon, including new mechanical coal-washing plant. Cost about $175,000 with machinery.

Stanolind Oil Co., Philcade Building, Tulsa, Okla., has let general contract to Waller-Wells Construction Co., 2423 East Thirteenth Place, for new oil products and chemical plant. Cost close to $100,000 with equipment.

Board of Education, Pratt, Kan., plans manual training department in new three-story and basement high school and junior college, for which general contract has been let to Ellis & Vollmer, Orpheum Building, Wichita, Kan. Cost about $250,000. Glen H. Thomas, 125 North Topeka Avenue, Wichita, Kan., is architect.

Common Council, Weatherford, Tex., is arranging a bond issue of $600,000, authorized at recent special election, fund to be used for new municipal electric power plant and distributing lines, water reservoir and other waterworks installation.

Board of Trustees, Texas College of Arts and Industries, Kingsville, Tex., J. O. Loftin, president, asks bids on general contract until Jan. 20 for new two-story industrial science building. Cost about $200,000 with equipment. Phelps, Dewees & Simmons, Gunter Building, are architects, and L. D. Royer, Smith-Young Tower Building, mechanical engineer, both San Antonio, Tex.

WESTERN PA. DIST.

Eljer Co., Ford City, Pa., manufacturer of plumbing fixtures and other sanitary ware, has leased building at 23-49 Borden Avenue, Long Island City, New York, for new factory branch, storage and distributing plant for metropolitan district.

Board of Education, Braddock, Pa., plans manual training equipment in new three-story central school, 135 x 240 ft., for which bids on revised plans will be asked early in January. Cost about $425,000. Charles J. Reiger, 529 Sheridan Avenue, Pittsburgh, is architect.

McCullough-Dalzell Crucible Co., Thirty-sixth Street and Allegheny Valley Railroad, Pittsburgh, manufacturer of crucibles and allied products, plans rebuilding part of plant at Lawrenceville, Pa., recently destroyed by fire. Loss close to $60,000 with equipment.

OHIO AND INDIANA

Ohio Sugar Co., Ottawa, Ohio, plans expansion and improvements in mill, including several new one-story units and installation of equipment. Cost close to $100,000 with machinery. Company is affiliated with Southern Acid & Sulphur Co., St. Louis.

City Council, City Hall, Cincinnati, C. O. Sherrill, city manager, plans new one-story municipal automobile service, repairs and garage building for city-owned cars and motor trucks. Bond issue of $225,000 has been authorized for building and equipment.

Industrial Rayon Corp., West Ninety-eighth Street and Walford Avenue, Cleveland, plans new mill for production of cut staple rayon, either in vicinity of mill at Painesville, Ohio, or Covington, Va. It will operate under a special process, and will include power house, pumping station, machine shop and other mechanical departments. Cost over $2,000,000 with machinery.

Contracting Officer, Materiel Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Jan. 3 for 32 pneumatic drills (Circular 506); until Jan. 4, three electric crane type trucks, 6000, 3000 and 1400 lb. capacity, last noted to be high-lift type (Circular 490); until Jan. 7, flexible conduit, galvanized conduit bushings, rigid steel conduit, conduit elbows, lock nuts, etc. (Circular 502).

Globe Valve Corp., Delphi, Ind., Max Gerber, president, care of Delphi Commercial Club, Delphi, is selecting local site for new one-story plant, 60 x 300 ft., for production of globe valves and kindred engineering specialties, including parts manufacture and assembling. Cost over $60,000 with equipment.

MICHIGAN DISTRICT

Divco-Twin Truck Co., 12801 East Jefferson Avenue, Detroit, motor trucks and parts, has plans for new works on Hoover Road, Macomb County, with main one-story unit and several auxiliary buildings, also office structure. Cost over $65,000 with equipment. Smith, Hinchman & Grylls, Inc., Marquette Building, Detroit, is architect and engineer.

Cadillac Tool & Die Co., 8016 Prairie Avenue, Detroit, has let general contract to Robert F. Tillotson, Birmingham, Mich., for new one-story plant on Tireman Avenue. Cost close to $40,000 with equipment.

Consumers Power Co., Jackson, Mich., is arranging fund of $16,000,000 for expansion and improvements in plants and system, including construction of two new steam-electric generating stations on Saginaw Bay at mouth of Saginaw River, and at Comstock on Kalamazoo River, respectively, each to cost about $3,000,000 with turbo-generator units, high-pressure boilers and auxiliary equipment; also extensions in transmission and distributing lines, rural electrification system extensions, power substations, switching stations and other structures. Bond issue is being arranged for $12,000,000 and further financing for remainder of fund, $4,000,000, will be carried out later.

Ford Motor Co., Dearborn, Mich., has engaged Albert Kahn, Inc., New Center Building, Detroit, architect and engineer, to prepare plans for new assembling plant on 370-acre tract near St. Louis, Mo., recently acquired, for which bids will be asked on general contract soon. Cost over $2,000,000 with equipment.

MIDDLE WEST

Payne Aircraft Corp., 1231 52nd Avenue, Cicero, Chicago, has leased 18-acre tract, improved with one-story buildings at Joliet, Ill., formerly occupied by Joliet Aircraft Corp., and will improve for new plant, including parts production and assembling. It is expected to have works ready soon, when initial manufacture will be given over to a new model mid-wing monoplane for instruction and sport use; later a single-seated biplane will be produced. Company has been operating an experimental plant at first noted address. Vernon W. Payne is engineer and head.

Chicago Beef & Veal Co., 3843 South Emerald Street, Chicago, meat packer, plans two-story and basement addition. Cost about $50,000 with equipment. H. C. Christiansen, 59 East Van Buren Street, is architect and engineer.

Purchasing Agent, Bureau of Reclamation, Denver, asks bids until Jan. 4 for one gasoline engine-driven electric generator set (Proposal A-22176-A).

City Council, Maquoketa, Iowa, asks bids until Jan. 6 for extensions and improvements in municipal electric power plant, including one 875-hp. heavy-duty diesel engine-generator unit, switchgear and auxiliary equipment.

Coca-Cola Bottling Co. of Chicago, Inc., 1101 West Congress Street, Chicago, has plans for new three-story mechanical-bottling plant at State and Seventy-third Streets. A one-story service, repair and garage building for company motor trucks and cars will be erected on adjoining site, with facilities for handling 100 cars. Bids will be asked soon on general contract. Cost close to $250,000 with equipment. Shaw, Naess & Murphy, 80 East Jackson Boulevard, are architects.

City Council, Freeman, S. D., will ask new bids soon for a municipal electric power plant and electrical distributing system. Bids recently received have been rejected. Cost about $100,000. Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa, is consulting engineer.

Winnebago County Board, Oshkosh, Wis., has voted appropriation of $40,000 for construction and equipment of new unit of County highway garage and service station, designed by J. F. Dreger, architect, 20 Algoma Boulevard. E. M. Bird is County highway commissioner.

Racine County Board, Racine, Wis., has voted appropriation of $36,000 for addition to and remodeling present Gatliff unit of County highway headquarters, including machine shop equipment. E. A. Klinger, 612 Fourteenth Street, local, is architect.

Ellsworth Pipe & Supply Co., Milwaukee, manufacturer of and jobber in plumbing, heating and related supplies, has acquired site, 197 x 210 ft., at West St. Paul Avenue and North Seventeenth Street, and contemplates early erection of warehouse and office building, machine and fabricating shop and pipe storage shed.

Independent Milwaukee Brewery, 2701 South Thirteenth Street, Milwaukee, has placed order with Wickes Boiler Co., Saginaw, Mich., for two large boilers, and with Westinghouse Electric & Mfg. Co., Pittsburgh, for two automatic stoker units, for $100,000 addition to brewery and power plant.

La Crosse *Tribune and Leader-Press*, Fifth and Jay Streets, La Crosse, Wis., has placed general contract with Theodore Molzahn & Sons, Inc., local, for new daily newspaper and general printing plant, to cost about $150,000 with equipment.

PACIFIC COAST

Armstrong Cork Co., Lancaster, Pa., corkboard insulation products and allied specialties, has let general contract to Lindgren & Swinerton, 605 West Olympic Boulevard, Los Angeles, for first unit of new branch plant on 28-acre tract near South Gate limits, Los Angeles, consisting of a main one-story manufacturing building, 85 x 240 ft., power house, office and other structures. Cost about $300,000 with equipment. Other units will be built later. Hugh M. Clarke is vice-president in charge. Henry Boettcher is company architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Jan. 4 for two electric winches, towing and mine sweeping, with spare parts (Schedule 2333) for Mare Island Navy Yard; rough machined steel forgings (Schedule 2343), copper nickel alloy condenser tubes (Schedule 2337) for Puget Sound and Eastern yards; until Jan. 7, spare parts for airplanes (Schedule 900-1288) for San Diego Naval Air Station.

Board of Education, 1151 South Broadway, Los Angeles, has approved plans for one-story manual training shop at Hollywood high school, 1521 North Highland Avenue. Cost about $50,000. Marsh, Smith & Powell, 816 West Fifth Street, Los Angeles, are architects. Similar shop will be erected at North Hollywood high school, 5231 Colfax Axenue. Cost about $35,000. Bids will be asked soon on general contracts.

City Council, Eugene, Ore., plans addition to municipal electric power plant, including steam-electric generating unit and auxiliary equipment for standby service. Cost about $490,000. J. W. McArthur is superintendent of Public Utilities Department, in charge.

Soquel Warehouse Co., Soquel (Santa Cruz County), Cal., plans new one-story mechanical precooling plant on old San Jose Road. Cost close to $45,000 with machinery. E. F. Hockenbeamer is general manager.

Western Bottling Co., 804 East Sprague Street, Spokane, Wash., has let general contract to Peter Young, 703 West Maxwell Street, for one-story and basement addition to mechanical-bottling works, 100 x 150 ft. Cost close to $60,000 with equipment. Foundations will be arranged for a second story. Arthur W. Cowley, Wellington Apartments, is architect.

FOREIGN

Imperial Chemical Industries, Ltd., London, England, has plans for new works at Bellshill, Scotland, for production of ammonia and allied products, with machine shop, power house and other mechanical departments. Cost about $650,000 with equipment.

Canadian Copper Refiners, Inc., Montreal, Que., plans expansion and improvements in local refinery, including new buildings and equipment. Cost over $500,000 with equipment.

Steel Co. of Canada, Inc., Hamilton, Ont., plans early rebuilding of part of benzol plant at local steel mills, comprising a four-story unit, recently partially destroyed by fire. Loss over $200,000 with equipment.

A LOST EYE
makes sad reading in your ledger

Let a worker go without goggles within eye-shot of danger — and when his luck *and yours* runs out, he'll be responsible for a column of red figures in your books that will give your accountants plenty of trouble.

First entry will be for compensation. Then others for lost time and production, perhaps damage to machine and materials. Still others for medical, administration and clerical charges. Plus *uncontrollable* charges — such as slow-down on production by fear-struck witnesses of the accident.

The American Duralite-50 Goggle (patented) is light, cool, comfortable. Its fuss-proof bridge provides easy permanent adjustment to any face. Super Armorplate lenses give maximum protection from impact.

And yet — to close your books against this threatened liability will cost you only a few dollars. And it's done as simply as this: Put a call in, now, for the local American representative. He will survey your plant without disturbing routine — will spot every eye-hazard, including the dangerous unnoticeable ones — and will give you an economical plan of American eye-protection covering every man and his job.

AMERICAN OPTICAL COMPANY

Manufacturers, for more than 100 years, of products to aid and protect vision. Factories at Southbridge, Mass. In Canada, Consolidated Optical Co., Ltd. Branch Offices in all principal industrial centers.

4337

CROSBY *for* STAMPINGS

Serving Industry Since 1896

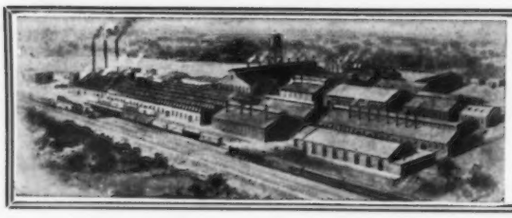
ALL our efforts have been concentrated on one product — STAMPINGS — for 40 years. We have made stampings, deep, intricate, heavy, light, large and small, for nearly every branch of industry.

Get Acquainted With Crosby Service

THE CROSBY COMPANY

General Offices and Works: BUFFALO, NEW YORK

Branch Offices: Chicago Detroit Cleveland New York Philadelphia



THE ATHENIA STEEL CO.

Clifton Ave., Clifton, N. J. Works, Athenia, N. J.

Makers of High Grade Tempered and Polished Steel for Clock, Watch, Motor and Typewriter Springs. Also Wound Springs. Tempered and Untempered Steel for other purposes. Special quality equal to finest imported for finish and accurate rolling. Also Stainless Steels of various grades.

AGENTS:—

Lapham Hickey Co.—3333 W. 47th Place, Chicago, Ill.—414 United Artists Bldg., Detroit, Mich.
E. F. Krause & Co.—430-440 Commercial St., Los Angeles, Calif.
Hill Chase & Co.—Richmond and Ontario Sts., Philadelphia, Pa.
Wetherell Bros. Co.—251 Albany St., Cambridge, Mass.

LEE-BUILT SPRINGS

A little higher — A lot better

LEE-BUILT TRADE SPRINGS

COMPRESSION — EXTENSION — FLAT — TORSION — WIRE FORMS — STAMPINGS

LEE SPRING CO., Inc. 30 Main Street, Brooklyn, N. Y.

Conomatics and Cone Automatics

Are economical and accurate producers of screw machine parts up to 6″ diameter, 7″ milling length. They cut costs, increase production, boost profits.

Write for particulars

CONE AUTOMATIC MACHINE CO., Inc.
WINDSOR, VERMONT

REPRESENTATIVES:

Detroit: J. C. Austerberry's Sons, 332 Curtis Bldg., Detroit, Mich.
Chicago: John H. Glover, 2127 North Sayre Ave., Chicago, Ill.
Ohio: S. B. Martin, 1677 Erie Cliff Drive, Lakewood, Ohio.
New England: Potter & Johnston Machine Co., Pawtucket, R. I.
Indiana: G. A. Richey, Chamber of Commerce Bldg., Indianapolis, Ind.
New York State: Syracuse Supply Co., Syracuse, N. Y.; also Buffalo, N. Y.
Pennsylvania: Arch Machinery Co., 1029 Park Bldg., Pittsburgh, Pa.
California: C. F. Bulotti Machinery Co., 829-831 Folsom St., San Francisco, Calif. Eccles & Davis Machinery Co., Inc., 1910 Santa Fe Avenue, Los Angeles, California.
Arthur Jackson Machine Tool Company, 60 Front Street West., Toronto 2, Canada, and 427 Grosvenor Avenue, Westmount, Que.

LELAND-GIFFORD COMPANY

Worcester, Mass.

Drilling Machinery
Belt and Motor Spindle
One to Six Spindles
Tapping Attachments and Multiple Heads

LUCAS "PRECISION"

Horizontal Boring, Drilling and Milling Machine

THE LUCAS MACHINE TOOL CO.

NOW AND ALWAYS OF

CLEVELAND, OHIO, U.S.A.

To the man who needs facts QUICKLY!

Sales Analyses, Market Survey and Data Reports, Customer Analyses, Distribution and Advertising Costs—quickly prepared from punched cards.

Up-to-the-minute facts for closer control are yours through the facilities of the International Business Machines Service Bureau. By means of punched cards and International Electric Bookkeeping and Accounting Machines, this Bureau will translate a mass of detail into live information. New, illustrated folder gives full details.

Send for this illustrated folder

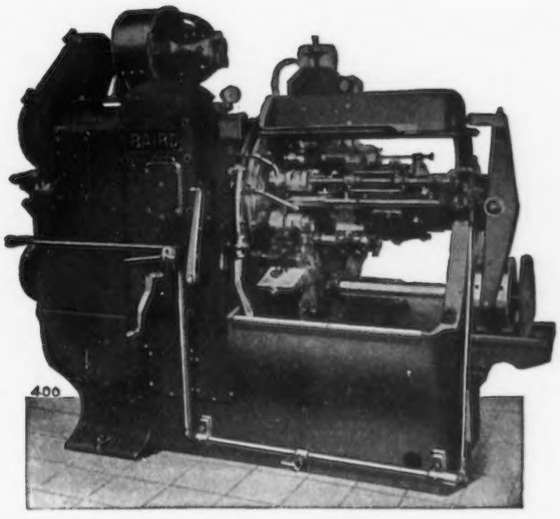
This folder shows examples of actual reports and explains the economy and speed which this unique Service offers. Write for free copy today.

INTERNATIONAL BUSINESS MACHINES CORPORATION

GENERAL OFFICES
270 BROADWAY, NEW YORK, N. Y.

BRANCH OFFICES IN
PRINCIPAL CITIES OF THE WORLD

BAIRD *Machines Win Against Rising Costs*



Multiple spindles, bringing many cutting tools into play, and automatic in operation is a sure way to make those savings which must be made under today's conditions.

Designing a machine to meet these specifications without running into excessive cost or complicated construction is a neat job which Baird has successfully performed.

Baird Automatic Multiple Spindle Chucking Machines will machine pieces up to 10½" diameter held in chucks or on centers. These machines are of horizontal and vertical types. Their speed and accuracy have cut production costs in many plants, and if you want to know how big the savings are—just send a sketch of one of your pieces. We will gladly give you a reliable estimate.

"Ask BAIRD About It"

THE BAIRD MACHINE CO.
BRIDGEPORT, CONNECTICUT

JUST BETWEEN US TWO

New Year's Gift

YOUR eyes will, we hope, gleam and pop when you see next week's issue, the Annual Number. In our biased eyes it will be one of the finest issues we have ever published.

Editors and others have labored days, nights and Sundays to lay before you what is essentially a great, concise report of the year's major developments in methods, materials, output, prices, legislation and labor relations, supplemented with cautious prognostications of what may be expected of the coming year.

If the big book is a day or so late in reaching you, forgive us, for the job of printing it is gargantuan.

House-Clearer

ALONG about four in the morning your New Year's Eve party will probably sag in the middle. You will be wishing your guests were home so that you could go to bed. You can bring this about by announcing that you are going to provide each guest who is still conscious with pencil and paper, and see how many of ten common, everyday words he can spell correctly.

Wait five minutes and if there is anyone who has not put on his rubbers and left, recite these ten words:

inoculate	*rarefy*
embarrass	*vilify*
harass	*desiccate*
supersede	*picnicking*
innuendo	*plaguy*

A perfect score is practically unknown. Anything above 60 per cent puts you in a class by yourself.

A Look Over Our Left Shoulder

WITH the year up tomorrow this is as good a time as any to view the vista of 1937, lick our wounds and gloat over our victories. The wounds were trifling—mere scratches. So on to victories:

(1) During the year the one big happy family grew in size; (2) advertising volume swelled; (3) despite the phenomenal growth of the picture magazines, this column held its Crosley rating—eighteen certified readers at the beginning of the year, the same at the end. Among our pleasant memories is the gift—our first—from an unknown admirer, of a complete set of stubs of tickets for football games played by a Cleveland high school.

So with heart high and energies up to their full 6-volt charge, this column is ready for almost anything the new year may bring forth.

Whitey Gives Us a Lesson

TWO weeks ago we said that one of the dice in the "natural" Whitey Maurath threw on page 23 of the Dec. 2 was standing on edge. George A. ("Whitey") Maurath replies:

"If I were you I believe I would investigate the technique of the dice before accusing me of using loaded dice. If you will take another look, you will note the right hand from which the dice came is turned palm up. "The orthodox cheater using mercury loaded or lop-sided dice keeps the palm of the hand down. In these days of high speed you should also be familiar with high speed cameras and that they can necessarily catch the dice on edge."

We would not accuse anyone, least of all an advertiser, of using loaded dice. Our point was that the die with the three uppermost had apparently come to rest on an uneven object, say a cockroach or the edge of a rug. We are grateful for the explanation and tested it out all day Sunday with a high-speed movie camera. We found that the dice came seven or eleven *in motion* not only once but several times on every roll. But we pay off only on inert naturals.

Happy New Year!

—A.H.D.

GOSS and DE LEEUW
MULTIPLE SPINDLE
CHUCKING MACHINES
Two, Four, Five Spindles • Work and Tool Rotating Types
GOSS & DE LEEUW MACHINE CO., NEW BRITAIN, CONN.

Products Index

ABRASIVE WHEELS — See Grinding Wheels

ABRASIVE CLOTH & PAPER
Norton Co., Worchester, Mass.

ABRASIVES—Steel Shot and Grit
Pangborn Corporation, Hagerstown, Md.

ACCESSORIES—Welding
Lincoln Electric Co., The, Cleveland.

ACCUMULATORS—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Hydraulik Gmbh, Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Wood, R. D., & Co., Philadelphia.

ACETYLENE—Dissolved in Cylinders & Small Tanks
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

ACID-PROOF CEMENT
Haveg Corporation, Newark, Delaware.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

ACID-PROOF CONSTRUCTION
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.

ACIDS—Pickling
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

AIR CONDITIONING EQUIPMENT
American Blower Corp., 6000 Russell St., Detroit

AIRMETERS AND VOLTMETERS
Weston Electrical Instrument Corp., Newark, N. J.

AIR TANKS AND CYLINDERS
Scaife, William B., & Sons Co., Ptgh.

ALLOYS—Copper
American Brass Co., The, Waterbury, Conn.

ALLOYS—Ferro
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

ALLOYS—Magnesium
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ALLOYS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

ALLOYS—Resistance Welding
Electroloy Co., Inc., 50 Church St., New York City.

ALLOYS—Titanium
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

ALLOYS—Tungsten
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Vanadium
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

ALLOYS—Zinc Base Die Casting
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ALUMINUM
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

AMMETERS AND VOLTMETERS—Recording
Leeds & Northrup Co., Philadelphia.

AMMONIA RECOVERY PLANTS
Koppers Co., Pittsburgh.

ANGLES, BEAMS, CHANNELS AND TEES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

ANGLES, BEAMS, CHANNELS & TEES —Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

ANNEALING—See Heat Treating

ANNEALING BOXES
Lebanon (Pa.) Steel Foundry.
United Engineering & Fdry. Co., Ptgh.

ANNEALING COVERS
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

ANODES—All Types
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Seymour (Conn.) Mfg. Co.
Udylite Co., The, Detroit.

ANODES—Cadmium
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

ANODES—Lead
National Lead Co., 111 Bdway., N. Y. C.

APPAREL—Welding
Lincoln Electric Co., The, Cleveland.

ARBORS
Cincinnati (Ohio) Milling Mch. Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

ARMORING MACHINERY—Cable, Wire, Hose
Sleeper & Hartley, Inc., Worcester, Mass.

ARRESTERS—Spark
Harrington & King Perforating Co., Chicago.

AXLES—Car or Locomotive
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

BABBITT METALS
Cadman, A. W., Mfg. Co., Pittsburgh, Pa.
National Lead Co., 111 Bdway., N. Y. C.

BALANCING MACHINES — Static Dynamic
Gisholt Machine Co., Madison, Wis.
Olsen, Tinius Testing Machine Co., Philadelphia.

BALING PRESSES—Scrap — See Presses —Baling

BALLS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.

BALLS—Steel, Brass or Bronze
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Hartford (Conn.) Steel Ball Co., The.
New Departure Div., General Motors Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.

BANDS—Steel
Acme Steel Co., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BANDS—Welded
Amer. Welding & Mfg. Co., Warren, O.

BARRELS—Burnishing
Abbott Ball Co., The, 1047 New Britain Ave., Hartford, Conn.
Ransohoff, N., Inc., Cincinnati.

BARRELS—Tumbling
Baird Mch. Co., The, Bridgeport, Conn.
Hartford (Conn.) Steel Ball Co., The.
Ransohoff, N., Inc., Cincinnati.
Whiting Corp., Harvey, Ill.

BARS—Alloy
Republic Steel Corp., Cleveland, Ohio.

BARS—Aluminum
Aluminum Co. of America, Pittsburgh.

BARS—Brass, Bronze or Copper
Bunting Brass & Bronze Co., Toledo, Ohio.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BARS—Cold Drawn
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

BARS—Concrete, Reinforcing
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Laclede Steel Co., St. Louis, Mo.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BARS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

BARS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

BARS—Steel
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Steel & Tubes, Inc., Cleveland.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

BATTERIES—Storage
Electric Storage Battery Co., The, Phila.
USL Battery Corp., Niagara Falls, N. Y.

BATTERY CHARGERS
Cutler-Hammer, Inc., Milwaukee.

BEAMS—See Angles, Beams, Channels and Tees

BEARINGS—Babbitt
Cadman, A. W., Mfg. Co., Pittsburgh, Pa.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

BEARINGS—Ball
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.

Products Index

New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.

BEARINGS, Brass and Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.

BEARINGS—Oilless
Bunting Brass & Bronze Co., Toledo, O.
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.
Richardson Co., The, Melrose Park, Ill.

BEARINGS—Quill
Bantam Bearings Corp., The, South Bend, Indiana.

BEARINGS—Radial
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Roll Neck
Bantam Bearings Corp., The, South Bend, Indiana.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller
Bantam Bearings Corp., The, South Bend, Indiana.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Standard Machinery Co., Providence, R. I.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Roller Tapered
Bantam Bearings Corp., The, South Bend, Indiana.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Rolling Mill Equipment
Bantam Bearings Corp., The, South Bend, Indiana.
Richardson Co., The, Melrose Park, Ill.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS—Self-aligning Roller
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Shaft Hanger
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.

BEARINGS—Thrust
Bantam Bearings Corp., The, South Bend, Indiana.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
Hyatt Bearings Div., General Motors Corp., Newark, N. J.
New Departure Div., General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Shafer Bearing Corp., 35 East Wacker Drive, Chicago.
Timken Roller Bearing Co., The, Canton, O.

BELT DRESSING
Rhoads, J. E., & Sons, Philadelphia.

BELT LACING
Rhoads, J. E., & Sons, Philadelphia.

BELT—Conveyor, Elevator
Goodyear Tire & Rubber Co., Akron, Ohio.
Goodrich, B. F., Co., The, Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BELTING CEMENT
Rhoads, J. E., & Sons, Philadelphia

BELTING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

BELTING—Metal, Conveyor, High and Low Temperature
Acme Steel Co., Chicago, Ill.
Cambridge (Md.) Wire Cloth Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

BELTING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

BELTS—V-Type
Allis-Chalmers Mfg. Co., Milwaukee.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BENDING MACHINES—Hand, Band and Angle
Excelsior Tool & Mch. Co., E. St. Louis, Ill.

BENDING MACHINES—Hand and Power
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Niagara Machine & Tool Works, Buffalo, N. Y.

BENZOL RECOVERY PLANTS
Koppers Co., Pittsburgh.

BERYLLIUM COPPER
American Brass Co., The, Waterbury, Conn.

BILLETS—Chrome Nickel Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Chrome Steel
Rustless Iron & Steel Corp., Baltimore, Md.

BILLETS—Forging
Alan Wood Steel Co., Conshohocken, Pa.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.

BILLETS—Re-rolling
Alan Wood Steel Co., Conshohocken, Pa.

BILLETS—Steel
Bethelhem (Pa.) Steel Company.
Continental Steel Corp., Kokomo, Ind.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

BIMETAL—Thermostatic
Chace, W. M., Co., 1605 Beard Ave., Detroit.

BINS—Rotating
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

BLANKS—Chisel
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

BLANKS—Gear and Pinion
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Richardson Co., The, Melrose Park, Ill.

BLANKS—Gear, Silent Steel
Waldron, John, Corp., New Brunswick, N. J.

BLAST CLEANING EQUIPMENT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

BLAST FURNACES
Brassert, H. A., & Co., Chicago, Ill.

BLAST GATES
Rockwell, W. S., Co., 50 Church St., N. Y. C.

BLOCKS—Chain
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

BLOWERS
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
North American Mfg. Co., The, Cleveland
Spencer Turbine Co., Hartford, Conn.

BLOWPIPES—Oxy-Acetylene Welding & Cutting
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

BLOWPIPES — Soldering, Heating, Annealing
American Gas Furnace Co., Elizabeth, N.J.
Weldit Acetylene Co., Detroit.

BOILERS
Munroe R., & Sons Mfg. Corp., Pittsburgh.

BOILERS—Waste Heat
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOILERS—Water Tube
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BOLT CUTTERS
Acme Machinery Co., Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.
Landis Machine Co., Inc., Waynesboro, Pa.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

BOLT & RIVET CLIPPERS
Bremil Mfg Co., Erie, Pa.
Helwig Mfg. Co., St. Paul, Minn.

BOLTS—Carriage and Machine
Cleveland (Ohio) Cap Screw Co., The
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

MARVEL Tapping Machines
7 Models (sizes) 7 Capacity Ratings.
7 Spindle Speeds.
A Complete Line of horizontal, friction type, motor driven Tapping Machines that do the work of much more expensive and complicated machines. Fine Thread 0 to ½" U.S.S. Taps in Steel. Complete accessories for all models.
Armstrong-Blum Mfg. Co. *"The Hack Saw People"*
5749 Bloomingdale Ave., Chicago, U.S.A.

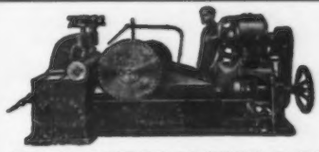
Write for Bulletin No. 500

Grinding
Polishing
Sanding
Drilling
Reaming

Strand

Nut Setting
Screw Driving
Rotary Filing
Stainless Steel
Weld Finishing

Flexible Shafts and Machines
Vertical and Horizontal Types—⅛ to 2 H.P.
Send for General Catalog
N. A. STRAND & CO.
5001 No. Lincoln St. Chicago



Cutting Off Machines for Sawing All Kinds of Metals
THE ESPEN-LUCAS MACHINE WORKS
FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

17 STYLES AND SIZES
MERRELL
PIPE THREADING for BETTER threads MACHINES
TOLEDO, OHIO

ARMSTRONG "C" CLAMPS
Drop forged from special steel. Alloy steel screws with double-wear threads. Extremely stiff, they will not slip or spread. 5 types. All sizes. Recognized as the finest clamps made.
Write for Catalog
Armstrong Bros. Tool Co.
"The Tool Holder People"
309 N. Francisco Ave., CHICAGO, U.S.A.
Eastern Warehouse and Sales: 199 Lafayette St., New York

Cutting-off Machines
—for thin and thick wall steel tubing and bars
BARDONS & OLIVER
Cleveland, Ohio
We also manufacture a large line of turret machinery for finishing cast iron, steel and brass

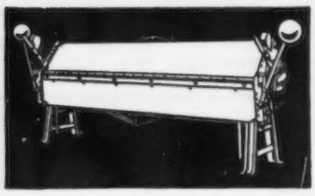
Famous for quality of threads they produce, long life of chasers and all-round dependability.
Following literature available:
Bulletin on H & G General Purpose Die Heads.
Bulletin on new Insert Chaser Type of Die Head.
Bulletin on H & G Threading Machines.
See our Advt., page 138, Nov. 4th Iron Age.
The Eastern Machine Screw Corp.
21-41 Barclay Street, New Haven, Conn.
Los Angeles: A. C. Behringer, 312 Commercial St., Los Angeles, Cal. San Francisco: Guy Reynolds, 464 Vernon St., Oakland, California.

Die Heads

THE CLEVELAND STEEL TOOL CO.
Punches, Dies, Chisels, Rivet Sets
660 E. 82nd St. Cleveland, O.
If it's RIVETED you KNOW it's safe

CHICAGO

BUILT OF STEEL



BRAKES, PRESSES AND SHEARS

DREIS & KRUMP MFG. CO.

7430 LOOMIS BLVD. CHICAGO, ILL.

SOMETHING NEW AND BETTER IN

Write for complete details.

Beatty also builds punching and shearing machines, vertical bulldozers, coping machines, spacing tables, and the Hammond Neveslip Portable Floor Crane.

SHEET METAL SHEARS

- NO FLYWHEEL
- NO CLUTCH
- NO TREADLE
- ARC WELDED
- NO COUNTER-WEIGHTS
- NO MOTOR IDLING
- AUTOMATIC HOLD-DOWN

BEATTY MACHINE & MFG. CO., 936-150TH STREET HAMMOND, IND.

***Reclinable* POWER PRESSES**

Among the many types of Zeh & Hahnemann presses the Reclinable Line meets the requirements for general stamping operations. They are reclinable to 40° and contain many improvements which contribute to strength, safety, ease of operation and high output. Send for bulletin.

ZEH & HAHNEMANN CO.,

Avenue A and Vanderpool Street

NEWARK, N. J.

PRESSES

FEEDS

AUTOMATIC EQUIPMENT

THE V & O Press Co.

HUDSON, N. Y.

Robinson Sheet Metal Working Machinery

Inclinable Presses **Gap Presses**
Double Crank Presses **Squaring Shears**
Horning Presses **Gap Shears**
Toggle Presses **Corrugating Machines**
Hand and Power Brakes

NEW ALBANY MACHINE MFG. CO.
Sole Owners, J. M. Robinson Mfg. Co.
NEW ALBANY, IND.

Products Index

BOLTS—Special
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS—Special, Hot or Cold Upset
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.

BOLTS—Stove
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.

BOLTS—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Upson Nut Div., Cleveland, O.

BOLTS AND NUTS
Clark Bros. Bolt Co., Milldale, Conn.
Erie (Pa.) Bolt & Nut Co.
Lamson & Sessions Co., The, Cleveland.
Oliver Iron & Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

BOLTS AND NUTS—Self-Locking
Lamson & Sessions Co., The, Cleveland, O.

BOND—Grinding Wheel
Bakelite Corp., 247 Park Ave., N. Y. C.

BOOTHS—Spray
DeVilbiss Co., The, Toledo, Ohio.

BORING BARS
Bullard Co., The, Bridgeport, Conn.

BORING, DRILLING & MILLING MACHINES—Horizontal
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
Lucas Machine Tool Co., Cleveland.
National Automatic Tool Co., Richmond Ind.

BORING & DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Bullard Co., The, Bridgeport, Conn.

BORING MACHINES—Diamond
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

BORING MACHINES—Diamond & Carbide Tools
Heald Mch. Co., Worcester, Mass.

BORING MACHINES—Jig
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

BORING & TURNING MILLS—Vertical
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.
Rogers Machine Wks., Alfred, New York.

BOX STRAPPING
Acme Steel Co., Chicago, Ill.

BRAKE LINING AND BLOCKS—Asbestos
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

BRAKES—Electric
Cutler-Hammer, Inc., Milwaukee.

BRAKES—Electric & Mechanical
Electric Controller & Mfg. Co., The, Cleveland.

BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

BRAKES—Metal Forming
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Pe'k, Stow & Wilcox Co., The, Southington, Conn.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Steelweld Machinery Co., Cleveland.

BRICK—Acid Resisting
Keagler Brick Co., Steubenville, Ohio.

BRICK—Fire Clay
Carborundum Co., The, Niagara Falls, N. Y.
Illinois Clay Products Co., Joliet, Ill.
Keagler Brick Co., Steubenville, Ohio.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

BRIDGE BUILDERS
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.

BRIDGE OPERATING MACHINERY—Movable
Earle Gear & Mch. Co., Philadelphia.

BRIQUETS—Ferroalloy
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

BROACHING MACHINES
Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

BRONZE FOR DIES
Ampco Metal, Inc., Milwaukee, Wis.

BRONZE—Phosphor
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

BRUSHES—Machine
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BRUSHES—Wire
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

BUCKETS—Clamshell
Blaw-Knox Co., Pittsburgh.
Hayward Co., The, 50 Church St., N. Y. C.
Industrial Brownhoist Corp., Bay City, Mich.

BUCKETS—Electric Motor
Hayward Co., The, 50 Church St., N. Y. C.

BUCKETS—Orange Peel
Hayward Co., The, 50 Church St., N. Y. C.

BUFFERS & POLISHING MACHINES
Packer Machine Co., The, Meriden, Conn.

BUFFING APPLICATORS—Automatic
Packer Machine Co., The, Meriden, Conn.

BUILDINGS—Factory
Ferguson, H. K., Co., The, Cleveland.

BUILDINGS—Steel
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Belmont Iron Works, Philadelphia.
Bethlehem (Pa.) Steel Co.
Blaw-Knox Co., Pittsburgh.
Ferguson, H. K., Co., The, Cleveland.
Iron & Steel Products, Inc., Chicago.

BULLDOZERS
Ajax Mfg. Co., The, Euclid, Ohio.
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Steelweld Machinery Co., Cleveland.

BULLDOZERS—Hydraulic
Elmes, Chas. F., Engng. Wks., Chicago.

BURNERS—Oil or Gas
North American Mfg. Co., The, Cleveland.
Wilson, Lee Engineering Co., The, Cleveland.

BUSHINGS—Bronze
Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Lawrenceville Bronze Co., Pittsburgh.
Phosphor Bronze Smelting Co., The, Phila.
Shenango-Penn Mold Co., Pittsburgh.

BUSHINGS—Oilless
Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

BUSHINGS—Phosphor Bronze
Bunting Brass & Bronze Co., Toledo, Ohio.
Phosphor Bronze Smelting Co., The, Phila.

BY-PRODUCTS COKE AND GAS OVENS
Koppers Co., Pittsburgh.

CABINETS—Stock
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

CABLE—Electric
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.

CABLEWAYS AND TRAMWAYS—See Tramways

CADMIUM
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Udylite Co., The, Detroit.

CADMIUM PLATING PROCESS
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington Del.
Udylite Co., The, Detroit.

CALCIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CALCULATING MACHINES
Monroe Calculating Machine Co., Inc., Orange, N. J.

CARBIC
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE
Air Reduction Sales Co 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

CARBIDE—Boron
Norton Co., Worcester, Mass.

CARBURIZING BOXES
Electro Alloys Co., Elyria, Ohio.

CARBURIZING—See Heat Treating

CARS—Railway
Iron & Steel Products, Inc., Chicago.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., The, Cleveland.
Bartlett, C. O.-Snow Co., The, Cleveland.

CASE HARDENING—See Heat Treating

CASTINGS—Acid or Heat Resisting
Ampco Metal, Inc., Milwaukee, Wis.
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Electro Alloys Co., Elyria, Ohio.
Hoskins Mfg. Co., Detroit, Mich.
Lebanon (Pa.) Steel Foundry.
Midvale Co., The, Nicetown, Phila., Pa.
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Alloy Iron
Forging & Casting Corp., The, Ferndale, Mich.

CASTINGS—Alloy Steel
Bissett Steel Co., The, Cleveland.
Dodge Steel Co., Philadelphia, Pa.
Electro Alloys Co Elyria, Ohio.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

Products Index

CASTINGS—Aluminum
Aluminum Co. of America, Pittsburgh.
Fairmount Foundry, Inc., Phila., Pa.

CASTINGS—Brass, Bronze, Copper or Aluminum
Cadman, A. W., Mfg. Co., Pittsburgh.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Lawrenceville Bronze Co., Pittsburgh.
National Bearing Metals Corp., Pittsburgh.
Phosphor Bronze Smelting Co.,The, Phila.
Snyder, W. P., & Co., Pittsburgh.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—Corrosion Resisting
Electro Alloys Co., Elyria, Ohio.
Meehanite Metal Corp., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.

CASTINGS—Die, Aluminum
Aluminum Co. of America, Pittsburgh.

CASTINGS—Electric Steel
Crucible Steel Castings Co., Lansdowne, Pa.
Dodge Steel Co., Philadelphia, Pa.
Lebanon (Pa.) Steel Foundry.

CASTINGS—Gray Iron
American Engineering Co., Philadelphia.
Cheney, S., & Son, Manlius, N. Y.
Commercial Steel Casting Co., Marion, Ohio.
Fairmount Foundry, Inc., Phila., Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lane Mfg. Co., Montpelier, Vt.
Midvale Co., The, Nicetown, Phila., Pa.
Murray Iron Wks. Co., Burlington, Iowa.
National Roll & Fdry. Co., Avonmore, Pa.
North Wales (Pa.) Mach. Co., Inc.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

CASTINGS—High Test & Alloy Iron
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

CASTINGS—Malleable
Baltimore (Md.) Malleable Iron & Steel Casting Co.
Carbon Malleable Casting Co., Inc., Lancaster, Pa.
Laconia (N. H.) Malleable Iron Co., Inc.
Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland.
Malleable Iron Fittings Co., Branford, Ct.
Peoria (Ill.) Malleable Castings Co.

CASTINGS—Meehanite Metal
Meehanite Metal Corp., Pittsburgh.

CASTINGS—Monel & Nickel
Superior Bronze Corp., Erie, Pa.

CASTINGS—Semi-Steel
Malleable Iron Fittings Co., Branford, Ct.

CASTINGS—Steel
Bethlehem (Pa.) Steel Company.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Commercial Steel Casting Co., Marion, Ohio.
Crucible Steel Castings Co., Lansdowne,Pa.
Dodge Steel Co., Philadelphia, Pa.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh.
Malleable Iron Fittings Co., Branford, Ct.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

CASTINGS—Wear Resisting
Meehanite Metal Corp., Pittsburgh.

CEMENT—Acid-Proof
Atlas Mineral Products Co. of Pa., The, Mertztown, Pa.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CEMENT—Refractory
Carborundum Co., The, Perth Amboy, N. J.
Johns-Manville Corp., 22 East 40th St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

CEMENT—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

CHAINS—Conveyor & Elevator
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Webster Mfg. Co., Chicago.

CHAINS—Portable
Barrett-Cravens Co., Chicago, Illinois

CHAINS—Power Transmission
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Webster Mfg. Co., Chicago.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Roller
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Bartlett, C. O.-Snow Co., The, Cleveland.
Diamond Chain & Mfg. Co. Indianapolis, Ind.
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHAINS—Silent
Link-Belt Co., Chicago.
Morse Chain Co., Ithaca, New York.
Ramsey Chain Co., Inc., Albany, N. Y.
Whitney Chain & Mfg. Co., Hartford, Ct.

CHANNELS—See Angles, Beams, Channels and Tees

CHECKS—Metal
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

CHEMICALS—Industrial
Du Pont de Nemours, E. I., & Co., Inc., Grasselli Chemicals Dept., Wilmington, Del.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CHEMICALS—Rust Proofing
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

CHROMIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

CHUCKING MACHINES—Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.
Goss & DeLeeuw Machine Co., New Britain, Conn.
National Acme Co., The, Cleveland.

CHUCKS—Air Operated
Hannifin Mfg. Co., Chicago.

CHUCKS—Drill
Cleveland (Ohio) Twist Drill Co., The.
Cushman Chuck Co., Hartford, Conn.
Morse Twist Drill & Mach. Co., New Bedford, Mass.

CHUCKS—Electric
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Lathe
Cushman Chuck Co., Hartford, Conn.

CHUCKS—Magnetic
Heald Mch. Co., Worcester, Mass.
Taft-Peirce Mfg. Co.,The,Woonsocket,R.I.

CIRCLES—Phosphor Bronze
Phosphor Bronze Smelting Co.,The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

CLEANERS—Metal
American Chemical Paint Co., Ambler, Pa.
Detroit Rex Products Co., Detroit, Mich.
Ford, J. B., Co., The, Wyandotte, Mich.
Pennsylvania Salt Mfg. Co., Phila., Pa.

CLEANING COMPOUNDS—Alkali
Detroit Rex Products Co., Detroit, Mich.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

CLEANING EQUIPMENT—Metal
Detroit Rex Products Co., Detroit, Mich.

CLEANING EQUIPMENT (Metal)—Electro-Chemical
Bullard Co., The, Bridgeport, Conn.

CLOTHING—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

CLUTCH-BRAKES—Magnetic
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

CLUTCHES
Fairbanks, Morse & Co., Chicago.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Medart Co., The, St. Louis, Mo.
Morse Chain Co., Ithaca, New York.

CLUTCHES—Magnetic
Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., Milwaukee.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

COAL
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Koppers Coal Co., Inc., The, Pittsburgh.
Pickands Mather & Co., Cleveland.

COAL, ORE AND ASH HANDLING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.
Webster Mfg. Co., Chicago.

COBALT METAL
Central Trading Corp., 511 Fifth Ave., N. Y. C.

COILS—Lead
National Lead Co., 111 Bdway., N. Y. C.

COILS—Pipe
Harrisburg (Pa.) Steel Corp.

COKE—Metallurgical
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Pickands Mather & Co., Cleveland.

COKE OVEN MACHINERY
Atlas Car & Mfg. Co., The, Cleveland.
Koppers Co., Pittsburgh.

COKE OVENS—By-Products
Koppers Co., Pittsburgh.

COKE OVENS—Cross Regenerators
Koppers Co., Pittsburgh.

COKE OVENS—With Recovery of By-Products
Koppers Co., Pittsburgh.

COLLETS
Rivett Lathe & Grinder, Inc., Boston, Mass.

COLUMBIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

aSECO
EXPORTERS
IRON and STEEL PRODUCTS
•
Offices and Agents Throughout the World
•
AMERICAN STEEL EXPORT CO., INC.
347 Madison Ave., New York, N. Y., U. S. A.
Cable Address: "AMSTA"

GRIFFIN
COLD ROLLED
STRIP STEEL
½" to 19" wide.
.002" to .500" thick
Desired Quality for Forming and Drawing
SALES AGENTS
NEW YORK CITY — Wm. H. Leonori & Co., Inc., 30 Howard St.
PHILADELPHIA—C. B. Tippett, 4308 North Broad St.
CHICAGO—Central Steel & Wire Co., 4545 South Western Blvd.
DETROIT—E. R. Wegener, 514 Stephenson Bldg.
CLEVELAND—Paterson-Leitch Co., 900 East 69th St.
BUFFALO—J. J. Lambert, 323 Huntington Ave.
DAYTON—Central Steel & Wire Co., 1095 East Monument Ave.
SAN FRANCISCO — Charles L. Lewis, 703 Market St.
GRIFFIN MFG. CO. ERIE, PENNA.

STANLEY STEEL
STEEL MAKERS SINCE 1871
BILLETS - SLABS - STRIP STEEL
THE STANLEY WORKS
NEW BRITAIN, CONN. - BRIDGEPORT, CONN. - HAMILTON, ONTARIO

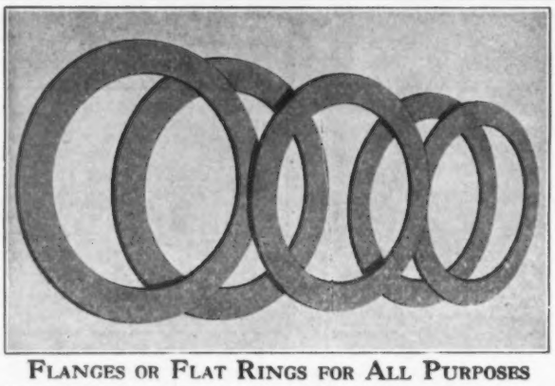
WETHERELL BROS. CO.
251 Albany St., Cambridge, Mass.
C. R. Strip
Tool Steel
Stainless Steel
O H Specialties

STAINLESS 18-8
LARGE STOCKS
PIPE
TUBING
FITTINGS
THE CLEVELAND TOOL & SUPPLY CO.
1427-1437 W. Sixth Street
CLEVELAND, OHIO

High Grade STRIP STEEL
Stamping and Deep Drawing—Uniform in Quality
Control of the quality begins with the manufacture of the steel in our own Open Hearth and continues through all subsequent processes.
LACLEDE STEEL CO., ST. LOUIS
STEEL WORKS & ROLLING MILLS, ALTON and MADISON, ILL.
OFFICES: Detroit—Chicago—St. Louis—Kansas City

RYERSON CERTIFIED STEELS
represent the highest quality obtainable in each class and type of material. All kinds from standard carbon grades to special alloys in stock for Immediate Shipment. Write for Stock List. Joseph T. Ryerson & Son, Inc.
Plants at: Chicago • Milwaukee • St. Louis • Cincinnati • Detroit
Cleveland • Buffalo • Boston • Philadelphia • Jersey City
RYERSON

MANGANO NON SHRINKABLE
ALSO HIGH SPEED STAINLESS & CARBON TOOL STEELS
DIE STEEL
LATROBE ELECTRIC STEEL CO.
LATROBE PA.


FLANGES OR FLAT RINGS FOR ALL PURPOSES
THE AMERICAN WELDING & MFG. CO., Warren, Ohio

STEEL FORGINGS
UPSET, DROP and COIN PRESSED
ANY ANALYSIS — ANY QUANTITY
Send us your blue prints for prices
ROCKFORD DROP FORGE CO.
2030 9th St.
ROCKFORD, ILL.

HOLLOW BORED SPINDLES
Machine tools must have good spindles. That is why leading machine tool builders use American Hollow Bored products. Write for prices on American Hollow Bored spindles, shafts, rams and hydraulic cylinders.
AMERICAN HOLLOW BORING CO.
1912 RASPBERRY ST. ERIE, PA.

POOR AND COMPANY
Any Size **FORGINGS** *Any Specification*
CANTON FORGE & AXLE WORKS
2025 DUEBER AVE., S. W., CANTON, OHIO

Products Index

COMBUSTION CONTROLS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.
Morgan Construction Co., Worcester, Mass.
North American Mfg. Co., The, Cleveland.

COMPOUNDS—Drawing
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

COMPRESSORS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Spencer Turbine Co., Hartford, Conn.
Sullivan Machinery Co., Michigan City, Ind.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Gas
Sullivan Machinery Co., Michigan City, Ind.
Worthington Pump & Machinery Corp., Harrison, N. J.

COMPRESSORS—Rebuilt. (See Clearing House Section)

CONCRETE CONSTRUCTION
Ferguson, H. K., Co., The, Cleveland.

CONDENSERS—Surface & Jet
Ingersoll-Rand Co., 11 Broadway, N.Y.C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

CONTRACTORS' SUPPLIES — Second-Hand. (See Clearing House Section)

CONTROL SYSTEMS—Temperature
Leeds & Northrup Co., Philadelphia.

CONTROLLERS—Crane
Cutler-Hammer, Inc., Milwaukee.

CONTROLLERS—Electric
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
General Electric Co., Schenectady, N. Y.

CONTROLLERS—Valve, Electrically Operated
Brown Instrument Co., The, Philadelphia, Pa.
Cutler-Hammer, Inc., Milwaukee.
Leeds & Northrup Co., Philadelphia.

CONVEYING AND ELEVATING MACHINERY
Bartlett, C. O.-Snow Co., The, Cleveland.
Link-Belt Co., Chicago.
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

CONVEYOR WORMS
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

CONVEYORS—Gravity
Logan Co., Inc., Louisville, Ky.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

CONVEYORS—Portable
Farquhar, A. B., Co., Ltd., York, Pa.
Robins Conveying Belt Co., 15 Park Row, N. Y. C.

COPING MACHINES
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

CORE OIL
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

CORUNDUM WHEELS — See Grinding Wheels

COTTERS AND KEYS—Spring
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lamson & Sessions Co., The, Cleveland.
Western Wire Prods. Co., St. Louis, Mo.

COUNTERBORES
Cleveland (Ohio) Twist Drill Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

COUNTERS—Production
Durant Mfg. Co., Milwaukee, Wis.
Veeder-Root, Inc., Hartford, Ct.

COUNTERS—Revolution, Recording
Durant Mfg. Co., Milwaukee, Wis.

COUNTING MACHINES
Veeder-Root, Inc., Hartford, Conn.

COUPLINGS—Air Hose
Cleveland (Ohio) Pneumatic Tool Co., The.

COUPLINGS—Cut-off Friction
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

COUPLINGS—Flexible
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Lovejoy Flexible Coupling Co., Chicago.
Morse Chain Co., Ithaca, New York.
Poole Foundry & Mch. Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Waldron, John, Corp., New Brunswick, N. J.

COUPLINGS—Pipe
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

CRANES—Crawling Tractor
Browning Crane & Shovel Co., Cleveland.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

CRANES — Electric, Industrial, Truck Mounted
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Browning Crane & Shovel Co., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANES—Electric Traveling
Armel, James P., Pittsburgh.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Electric Hoist & Motor Co., 149 N. 9th St., Bklyn., N. Y.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Maris Brothers, Inc., Philadelphia.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

CRANES—Gantry
Browning Crane & Shovel Co., Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Whiting Corp., Harvey, Ill.

CRANES—Hand Power
American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Maris Brothers, Inc., Philadelphia.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

CRANES—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of the Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Conco Engineering Works, Mendota, Ill.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

CRANES—Locomotive
Browning Crane & Shovel Co., Cleveland.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.

CRANES—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

CRANES—Portable
Canton Fdry. & Mch. Co., Cleveland.

CRANES—Portable Electric
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.

CRANKSHAFTS
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Union Drawn Steel Co., Massillon, Ohio.

CRANKSHAFTS—Forged
Bay City Forge Co., Erie, Pa.

CRUSHERS—Coal
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CRUSHERS—Steel Turning
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

CUTTERS—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

Products Index

CUTTERS—Keyseating
Davis Keyseater Co., 400 Exchange St. Rochester, N. Y.

CUTTERS—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Cleveland (Ohio) Twist Drill Co., The.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

CUTTING-OFF MACHINES—Abrasives
Tabor Mfg. Co., Phila.

CUTTING-OFF MACHINES—Cold Saw
Espen-Lucas Mch. Wks., Philadelphia.

CUTTING-OFF MACHINES—Pipe or Tubing
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardons & Oliver, Cleveland.
Landis Mch. Co., Inc., Waynesboro, Pa.

CUTTING AND WELDING APPARATUS—Oxy-Acetylene—See Welding and Cutting Machines and Equipment—Oxy-Acetylene.

CYLINDERS — Compressed Air & Hydraulic
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Tomkins-Johnson Co., The, Jackson, Mich.

CYLINDERS—Seamless
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

DEGREASING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

DEGREASING MACHINES—Solvent
Detroit Rex Products Co., Detroit, Mich.

DEOXIDIZERS
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

DICTATING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

DIE-FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

DIE SETS
U. S. Tool Co., Inc., Ampere, N. J.

DIE SINKING MACHINES — Automatic and Hand
Cincinnati (Ohio) Milling Mch. Co., The.
Pratt & Whitney Div., Niles-Bement-Pond Co., Hartford, Conn.

DIEING MACHINES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.

DIES—Cast Tool Steel
Forging & Casting Corp., The, Ferndale, Mich.

DIES, JIGS, FIXTURES, etc.
Atlantic Mfg. Co., Philalelphia.
Taft-Peirce Mfg. Co.,The,Woonsocket,R. I.

DIES—Pipe Threading
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Screw and Thread Cutting
Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.

DIES—Self-Opening Adjustable
Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

DIES—Sheet Metal Working
Worcester (Mass.) Stamped Metal Co.

DIES—Steel Letters and Stamps
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

DOORS & SHUTTERS, Fireproof
Kinnear Mfg. Co., Columbus, Ohio.

DOORS & SHUTTERS—Steel or Wood Rolling
Kinnear Mfg. Co., Columbus, Ohio.

DRAWN WORK—Metal—See Stampings or Drawings—Metal

DRILL FILING SYSTEMS
Huot Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILL HEADS—Hydraulic
National Automatic Tool Co.,Richmond,Ind.

DRILL HEADS—Multiple
Baker Bros., Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

DRILL INDEX
Huot Mfg. Co., 500 Robert St., St. Paul, Minn.

DRILLING MACHINES—Bench
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Heavy Duty
Baker Bros., Inc., Toledo, Ohio.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Inc., Toledo, Ohio.
Henry & Wright Mfg. Co., The, Hartford Conn.
National Automatic Tool Co., Richmond Ind.

DRILLING MACHINES—Multiple Spindle Adjustable
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Multiple Spindle Horizontal
Baker Bros., Inc., Toledo, Ohio.
National Automatic Tool Co., Richmond, Ind.

DRILLING MACHINES—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electric Tool Corp., Chicago.

DRILLING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Helwig Mfg. Co., St. Paul, Minn.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

DRILLING MACHINES—Radial
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Sensitive
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Upright
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.

DRILLING MACHINES—Vertical
Baker Bros., Inc., Toledo, Ohio.
Cincinnati (Ohio) Bickford Tool Co., The.

DRIVES—Gear
Farrel-Birmingham Co., Inc.,Buffalo,N.Y.
Mesta Mch. Co., Pittsburgh.

DRIVES—Single & Multiple V-Belts
Allis Chalmers Mfg. Co., Milwaukee.

DROP FORGINGS—See Forgings—Drop, Iron or Steel

DROP HAMMERS—See Hammers—Drop

DUST COLLECTORS
Atrasive Machine Tool Co., East Providence, R. I.
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., 6000 Russell St., Detroit.
American Foundry Equipment Co., The, 401 Bykrit St., Mishawaka, Ind.
Blaw-Knox Co., Pittsburgh.
Pangborn Corporation, Hagerstown, Md.
Whiting Corp., Harvey, Ill.

ECONOMIZERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

ELECTRIC HEATING ELEMENTS
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

ELECTRIC LIGHTING—Industrial
General Electric Co., Cleveland.
General Electric Vapor Lamp Co., Hoboken, N. J.

ELECTRIC WELDING — See Welding — Electric

ELECTRICAL EQUIPMENT
Allis-Chalmers Mfg. Co., Milwaukee.
General Electric Co., Schenectady, N. Y.

ELECTRICAL MACHINERY — Second Hand. (See Clearing House Section)

ELECTRICAL WIRES
Roebling's, John A., Sons Co., Trenton, N. J.

ELECTRODE HOLDERS—Welding
Lincoln Electric Co., The, Cleveland.

ELECTRODES—Resistance Welding
Electroloy Co., Inc., 50 Church St., New York City.

ELECTRODES—Welding, Coated
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio.

ELECTROPLATING EQUIPMENT & SUPPLIES
Udylite Co., The, Detroit.

ELEVATORS—Portable
Barrett-Cravens Co., Chicago, Ill.
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

ELEVATORS—Steam Hydraulic
Ridgway, Craig, & Son Co., Coatesville, Pa.

EMERY WHEELS—See Grinding Wheels

ENGINEERS & CONTRACTORS
Ferguson, H. K., Co., The, Cleveland.

ENGINEERS—Consulting and Industrial
Koppers Co., Pittsburgh.

ENGINES—Diesel
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Gas
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

ENGINES—Oil
Worthington Pump & Machinery Corp., Harrison, N. J.

EYELET MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

FACING CLAY
Carborundum Co., The, Perth Amboy, N.J.

FACTORY & PLANT SITES
Zoll, Edward H., 196 Market St., Newark, N. J.

FANS—Ventilating
American Blower Corp., 6000 Russell St., Detroit.
DeVilbiss Co., The, Toledo, Ohio.

FEED WATER HEATERS AND PURIFIERS
Harrisburg (Pa.) Steel Corp.

FEEDS—Hydraulic, for Machines
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

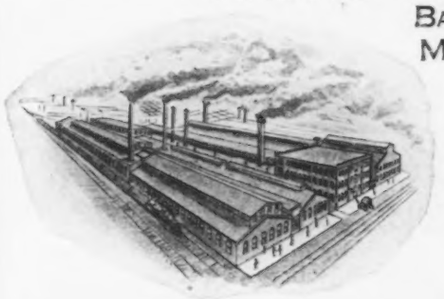
FELT—Wool Mechanical
American Felt Co.,315 Fourth Ave.,N.Y.C.

UPHOLDING QUALITY SINCE 1906 ATLAS

ATLAS DROP FORGINGS
All shapes and sizes to 500 lbs.
ANY STEEL ALLOY • LABORATORY CONTROLLED
ATLAS DROP FORGE CO • LANSING MICHIGAN

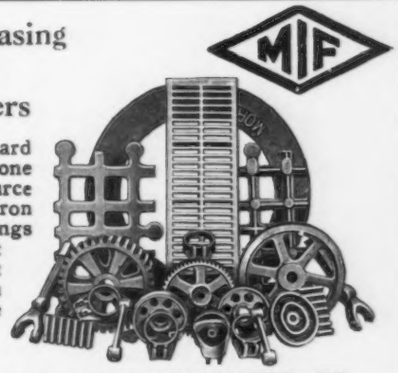
MALLEABLE Certified CASTINGS
We specialize in castings with high yield point, ductility, machinability, surface finish and service.
LACONIA MALLEABLE IRON CO. INC., Laconia, N.H.

BALTIMORE MALLEABLE IRON AND STEEL CASTING COMPANY
ESTABLISHED 50 YEARS
BALTIMORE MARYLAND



MANUFACTURERS OF MALLEABLE IRON CASTINGS

You, Purchasing Agents and Plant Owners
often have a hard row to hoe. If one good reliable source of Malleable Iron and Steel Castings would make it any easier, let MIF show you how to eliminate one worry.



MALLEABLE IRON FITTINGS CO.
BRANFORD, CONN.

MANUFACTURERS OF
GRAY IRON SPECIALTIES
Completely Finished Articles of Gray Iron
S. CHENEY & SON
GRAY IRON FOUNDERS MANLIUS, N. Y.

From a Pound to a Ton ELECTRIC Inquiries Solicited
STEEL CASTINGS
CRUCIBLE STEEL CASTINGS COMPANY
LANSDOWNE, DELAWARE COUNTY, PENNSYLVANIA
(Near Philadelphia)

FAIRMOUNT FOUNDRY, INC.
Grey Iron, Semi-Steel, Aluminum and Heat-Resisting Castings
Equipped with Moulding Machines
Main Office:
Third & Westmoreland Sts., Philadelphia, Pa.
Plants:
Philadelphia & Hamburg, Pa.

HEAVY — MEDIUM
STAMPINGS
SEND SAMPLES OR BLUE PRINTS FOR ESTIMATES
LANSING STAMPING CO.
SO. PENN. AVE. LANSING, MICHIGAN

SHEET METAL WORK.

Small orders solicited as well as quantity production

Our facilities consist of shearing and forming equipment up to 10′ and 3/16″; large number of presses, spot welders, oxy-acetylene and arc welders. Send us drawing or samples for prices.

CHAMPION SHEET METAL CO., Inc.
COR. SQUIRES AND DUANE STS. CORTLAND, NEW YORK

GRAMMES SERVICES INCLUDE:

ETCHING LITHOGRAPHY EMBOSSING
HARD ENAMEL
MET-A-LABELS
STAMPINGS
WIRE FORMING

FINISHING
MACHINERY
ASSEMBLING
TOOLS & DIES

L. F. GRAMMES & SONS, INC.
MANUFACTURERS—ESTABLISHED 1875
ALLENTOWN, PENNSYLVANIA

STAMPED METAL PARTS

for every industry

WORCESTER STAMPED METAL ©
QUALITY STAMPING

We have had many years of Light and Heavy Stamping Experience. We offer you the benefit of our knowledge and equipment.

WORCESTER STAMPED METAL CO.
Established 1883 WORCESTER, MASS.

Products Index

FENCING—Wire
Pittsburgh (Pa.) Steel Co.

FERROALLOYS
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROCHROME
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROMANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank & Co., Inc., Philadelphia.

FERROMOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICO MANGANESE
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Pittsburgh Metallurgical Co., Inc., Niagara Falls, N. Y.
Samuel, Frank, & Co., Inc., Philadelphia.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSILICON ALUMINUM
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROSPIEGELEISEN
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

FERROTITANIUM
Titanium Alloys Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FERROVANADIUM
Electro Metallurgical Sales Corp., 30 E 42nd St., N. Y. C.
Vanadium Corp. of America, 420 Lexington Ave., N. Y. C.

FILES & RASPS
Disston, Henry, & Sons, Inc., Philadelphia.
Nicholson File Co., Providence, R. I.

FILING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.

FILTER CLOTH—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

FILTERS—Air
American Air Filter Co., Inc., Louisville, Ky.

FILTERS—OIL
National Acme Co., The, Cleveland.

FILTERS—Pressure or Gravity
Scaife, Wm. B., & Sons Co., Pittsburgh.

FIRE BRICK—Insulating
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Quigley Co., Inc., 56 West 45th St., N. Y. C.

FIRE CLAY
Carborundum Co., The, Perth Amboy, N. J.
Illinois Clay Products Co., Joliet, Ill.
Keagler Brick Co., Steubenville, Ohio.
West Virginia Fire Clay Mfg. Co., Pittsburgh.

FITTINGS—Brass, Pipe and Tube
Commonwealth Brass Corp., Detroit.

FIXTURES—For Machine Tools
Knu-Vise Products Co., Detroit, Mich.

FLANGES—Forged Steel
Harrisburg (Pa.) Steel Corp.
Standard Steel Wks. Co., Burnham, Pa.

FLANGING WORK—Carbon and Alloy
Worth Steel Co., Claymont, Del.

FLEXIBLE SHAFT EQUIPMENT
Lovejoy Flexible Coupling Co., Chicago.
Strand, N. A., & Co., Chicago.

FLOODLIGHTS—Acetylene
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

FLOOR ARMORING
Acme Steel Co., Chicago, Ill.

FLOOR (CONCRETE) REPAIR MATERIALS
Flexrock Co., 892 N. Delaware Ave., Phila., Pa.

FLOOR PLATES—See Plates—Floor or Cellar Door

FLOORING—Acid Proof
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

FLOORING—Monolithic
Johns-Manville Corp., 22 East 40th St., New York City.

FLOORING—Open Steel
Blaw-Knox Co., Pittsburgh.
Dravo Corp., Pittsburgh.
Hendrick Mfg. Co., Carbondale, Pa.

FLOORING—Steel
American Pressed Steel Co., Phila., Pa.

FLUX—Welding
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

FORGING MACHINES—Roll
Ajax Mfg. Co., The, Euclid, Ohio.

FORGING MACHINES—Upset
Acme Machinery Co., Cleveland.
Ajax Mfg. Co., The, Euclid, Ohio.

FORGINGS—Alloy Steel
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Aluminum
Aluminum Co. of America, Pittsburgh.

FORGINGS—Brass, Bronze or Copper
American Brass Co., The, Waterbury, Conn.
Commonwealth Brass Corp., Detroit.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

FORGINGS—Coin Pressed
Rockford (Ill.) Drop Forge Co.

FORGINGS—Drop, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Billings & Spencer Co., Hartford, Conn.
Canton (Ohio) Drop Forging & Mfg. Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Forging & Casting Corp., The, Ferndale, Mich.
Poor & Co., Canton Forge & Axle Wks., Canton, Ohio
Rockford (Ill.) Drop Forge Co.
Storms Drop Forging Co., Springfield, Mass.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Williams, J. H., & Co., Buffalo, N. Y.

FORGINGS—Hollow
Harrisburg (Pa.) Steel Corp.
National Forge & Ordnance Co., Irvine, Pa.

FORGINGS—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

FORGINGS—Hydraulic Press, Iron or Steel
Atlas Drop Forge Co., Lansing, Mich.
Bethlehem (Pa.) Steel Company.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.
Standard Steel Wks. Co., Burnham, Pa.

FORGINGS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

FORGINGS—Upset
Bethlehem (Pa.) Steel Company.
Lamson & Sessions Co., The, Cleveland.
Rockford (Ill.) Drop Forge Co.

FORMING AND COILING MACHINES
Peck, Stow & Wilcox Co., The, Southington, Conn.

FOUNDRY EQUIPMENT & SUPPLIES
Whiting Corp., Harvey, Ill.

FURNACE ENGINEERS
Electric Furnace Co., The, Salem, Ohio.
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Annealing & Case Hardening
American Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Leeds & Northrup Co., Philadelphia.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Billet or Ingot Heating
Flinn & Dreffein Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Brass Melting
Monarch Engineering & Mfg. Co., The, Baltimore, Md.

FURNACES—Electric, Steel Melting
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
General Electric Co., Schenectady, N. Y.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

FURNACES—Enameling
Carborundum Co., The, Perth Amboy, N. J.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Forging
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Heat Treating, Automatic
Amer. Gas Furnace Co., Elizabeth, N. J.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Leeds & Northrup Co., Philadelphia.
Rockwell, W. S., Co., 50 Church St., N. Y. C.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Cyanide of Lead
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Surface Combustion Corp., 2375 Dorr St., Toledo.

FURNACES—Heat Treating, Electric
Electric Furnace Co., The, Salem, Ohio.
General Electric Co., Schenectady, N. Y.
Holcroft & Co., Detroit.

Products Index

Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.
Maehler, Paul Co., The, Chicago.
Rockwell, W. S., Co., 50 Church St., N.Y.C
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

FURNACES—Heat Treating, Oil or Gas
Chicago (Ill.) Flexible Shaft Co.
Electric Furnace Co., The, Salem, Ohio.
Holcroft & Co., Detroit.
Maehler, Paul Co., The, Chicago.
Monarch Engineering & Mfg. Co., The, Baltimore, Md.
Rockwell, W. S., Co., 50 Church St., N.Y.C.
Surface Combustion Corp., 2375 Dorr St., Toledo.
Wilson, Lee Engineering Co., The, Cleveland.

FURNACES—Pack Heating Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

FURNACES—Rivet Heating, Electric
General Electric Co., Schenectady, N. Y.

FURNACES—Wire, Annealing and Galvanizing
General Electric Co., Schenectady, N. Y.
Surface Combustion Corp., 2375 Dorr St., Toledo.

GAGE BLOCKS
Ford Motor Co. (Johansson Division), Dearborn, Mich.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GAGES—Dial
Starrett, L. S., Co., Athol, Mass.

GAGES—Electric
Sheffield Gage Corp., Dayton, Ohio.

GAGES—Plug and Snap
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

GAGES—Pressure & Vacuum Recording
Brown Instrument Co., The, Philadelphia, Pa.

GAGES—Temperature
Weston Electrical Instrument Corp., Newark, N. J.

GAGES—Thickness, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

GAGES—Thread Lead
Jones & Lamson Mch. Co., Springfield, Vt.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Sheffield Gage Corp., Dayton, Ohio.

GALVANIZING
Castle, Joseph P., & Bros., Phila.

GALVANIZING COMPOUNDS
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

GALVANIZING PLANTS—For Sheets
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Erie (Pa.) Foundry Co.

GAS ANALYSIS RECORDERS
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

GAS FOR INDUSTRIAL USES
American Gas Association, 420 Lexington Ave., N. Y. C.

GAS PRODUCERS
Flinn & Dreffein Co., Chicago.
Koppers Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Wood, R. D., & Co., Philadelphia.

GAS RECOVERY COKE OVENS
Koppers Co., Pittsburgh.

GASKETS—Asbestos, Metal or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

GASKETS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

GEAR CUTTING
Earle Gear & Machine Co., Phila.
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

GEAR CUTTING MACHINES
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Gleason Works, Rochester, N. Y.

GEAR DRIVES—Herringbone
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pgh.

GEARMOTORS
Allis-Chalmers Mfg. Co., Milwaukee.
James, D. O., Mfg. Co., Chicago.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GEAR PLANNING MACHINES
Gleason Works, Rochester, N. Y.

GEARS—Bevel
Boston Gear Wks., Inc., North Quincy, Mass.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Richardson Co., The, Melrose Park, Ill.

GEARS—Heat Treated
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Herringbone
Farrel-Birmingham Co., Inc., Buffalo, N.Y.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Mesta Mch. Co., Pittsburgh.
Philadelphia (Pa.) Gear Works.

GEARS—Machine Cut
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Gleason Works, Rochester, N. Y.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Simonds Mfg. Co., Pittsburgh.

GEARS—Machine Molded
Poole Foundry & Mch. Co., Baltimore, Md.

GEARS—Non-Metallic
Boston Gear Wks., Inc., North Quincy, Mass.
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
General Electric Co., Schenectady, N. Y.
James, D. O., Mfg. Co., Chicago.

GEARS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

GEARS—Steel, Silent
Waldron, John, Corp., New Brunswick, N. J.

GEARS—Spur
Boston Gear Wks., Inc., North Quincy, Mass.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.
Simonds Mfg. Co., Pittsburgh.

GEARS—Worm
Boston Gear Wks., Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.
Philadelphia (Pa.) Gear Works.

GENERATORS—Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

GENERATORS—Electric
Fairbanks, Morse & Co., Chicago.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engng. Co., Cleveland.
Westinghouse Elec. & Mfg. Co., East Pgh.

GENERATORS—Electric, Second Hand. (See Clearing House Section)

GLOVES—Asbestos & Fireproof
Safety Equipment Service Co., Cleveland.

GOGGLES—Safety
American Optical Co., Southbridge, Mass.
Safety Equipment Service Co., Cleveland.

GOVERNORS—Air Compressor
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

GRABS—For Sheets and Coils
J-B Engineering Sales Co., 1738 Orange St., New Haven, Conn.

GRATING—Flooring, Sidewalk, etc.—See Flooring—Open Steel

GREASE—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

GRILLES—Metal Cane
Diamond Mfg. Co., Wyoming, Pa.

GRILLES—Perforated Metal
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforated Co., Chicago.

GRINDING AND POLISHING MACHINES
Black & Decker Mfg. Co., The, Towson, Md.
Excelsior Tool & Mch. Co., E. Et. Louis, Ill.
Norton Co., Worcester, Mass.
Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

GRINDING MACHINES—Broach
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Centerless
Cincinnati (Ohio) Grinders Incorporated.

GRINDING MACHINES—Cutter & Reamer
Cincinnati (Ohio) Milling Mch. Co., The.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cylinder
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg. Co., Providence, R.I.
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Die
Landis Mch. Co., Inc., Waynesboro, Pa.

GRINDING MACHINES—Drill
Gallmeyer & Livingston Co., Grand Rapids, Mich.

STEEL STAMPINGS
FLAT AND FORMED PIECES OF MEDIUM SIZE OUR SPECIALTY
LIGHT WASHERS AND BURRS JAPANNING ELECTRO PLATING
J. H. SESSIONS & SON, Bristol, Conn., U. S. A.

Hayward Buckets

Use this Electric Motor Clam Shell for reclaiming material as required.
THE HAYWARD CO., 46-50 Church St., N. Y.

ELEVATORS Steam Hydraulic
The Ridgway Steam Hydraulic Elevator is PERFECTION for the man who has steam or air available.
Hundreds in use in Biggest Plants
"HOOK 'ER TO THE BILER!"
CRAIG RIDGWAY & SON CO., COATESVILLE, PA.

CRANES
All Types
Foundry Equipment
Special Machinery
Evaporation
Chemical Machinery
Pulverized Coal Equipment
Stokers
WHITING CORPORATION
HARVEY-ILL. U.S.A.
(CHICAGO SUBURB)

LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS
OHIO
THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS OHIO

GIVE PROFIT A LIFT . . . .
With the Canton Portable Crane. It saves the time of your men and it saves the expense of using large cranes for the smaller lifting jobs. Built in 8 sizes with friction load brake. Interested in a 30-day free trial?
Also manufacturers of alligator shears and industrial turntables.

CANTON FOUNDRY & MACHINE CO.
6400 Breakwater Ave. Cleveland, Ohio

OVERHEAD CRANES • ELECTRIC HOISTS
CRAWLER CRANES • ELECTRIC MOTORS
ARC WELDERS • WELDING ELECTRODES
WRITE FOR LITERATURE ON P&H PRODUCTS—4401 W. NATIONAL AVE., MILWAUKEE, WIS.
HARNISCHFEGER CORPORATION
HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

CONCO CRANES
BUILDERS FOR 20 YEARS—ALL TYPES, IN CAPACITIES TO 20 TONS — HOISTS — TROLLEYS
CONCO ENGINEERING WORKS
DIVISION OF H. D. CONKEY & COMPANY
405 CARLSON AVE • MENDOTA, ILL.

MARIS BROTHERS INC.
G. A. WHITEHEAD, OWNER
56th and GRAYS AVE.
PHILADELPHIA, PA.
CRANES-HOISTS
HAND ELECTRIC

ROBBINS & MYERS INC.
SPRINGFIELD, OHIO
ELECTRIC and HAND HOISTS—CRANES

DETROIT HOISTS
ELECTRIC and PNEUMATIC
CAPACITIES ¼ to 10 TONS
DETROIT HOIST & MACHINE CO.

EARLE GEARS
The Earle Gear & Machine Co.
4715 Stenton Ave.
Philadelphia, Pa.
110 State St., Boston, Mass.
95 Liberty St., New York City
Cut Spur, Bevel, Herringbone and Worm Gears
All Sizes. Every Description Operating Machinery for Bridges, etc. "Lea Simplex" Cold Metal Saws.

Need GEARS?
SEE SIMONDS
MAXIMUM SIZES
Spur Gears 145" Dia.
Bevel & Mitre Gears 60" Dia.
Worm Gears 72" Dia.
Worms 12" Dia.
Racks 10" Face. 1 D.P. / 9" Face. 3½ C.P.
Internal Gears 30" Dia., 4 D.P.
MATERIALS
Cast Iron
Cast Steel
Forged Steel
Non-Ferrous Metals
Rawhide
Bakelite
All-Steel Silent Pinions
SIMONDS
HEAT TREATED GEARS FOR SEVERE SERVICE
THE SIMONDS MANUFACTURING CO., PITTSBURGH PA

WM. B. SCAIFE & SONS CO.
OAKMONT PA.
TANKS
FOUNDED 1802
PITTSBURGH DISTRICT
COPPER-BRAZED TANKS
ALSO
WELDED AND RIVETED CONSTRUCTION
A.S.M.E. CODE I.C.C. SPECIFICATIONS
WATER PURIFYING APPARATUS
PITTSBURGH NEW YORK CHICAGO

Products Index

GRINDING MACHINES—Gear & Worm
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

GRINDING MACHINES—Internal
Greenfield (Mass.) Tap & Die Corp.
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Centerless
Heald Mch. Co., Worcester, Mass.

GRINDING MACHINES—Internal Multiple Spindle
Baird Mch. Co., The, Bridgeport, Conn.

GRINDING MACHINES—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electrical Tool Corp., Chicago.

GRINDING MACHINES—Portable Flexible Shaft
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Strand, N. A., & Co., Chicago.

GRINDING MACHINES—Portable Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Roll
Cincinnati (Ohio) Grinders Incorporated.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Snagging
Black & Decker Mfg. Co., The, Towson, Md.
Warner & Swasey Co., The, Cleveland.

GRINDING MACHINES—Surface
Abrasive Machine Tool Co., E. Prov., R. I.
Blanchard Machine Co., The, Cambridge, Mass.
Gallmeyer & Livingston Co., Grand Rapids, Mich.
Heald Mch. Co., Worcester, Mass.
Norton Co., Worcester, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Swing Frame
Black & Decker Mfg. Co., The, Towson, Md.

GRINDING MACHINES—Tap
Gallmeyer & Livingston Co., Grand Rapids, Mich.

GRINDING MACHINES—Tool
Cincinnati (Ohio) Milling Mch. Co., The.
Gisholt Machine Co., Madison, Wis.
Landis Tool Co., Waynesboro, Pa.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Norton Co., Worcester, Mass.

GRINDING MACHINES—Universal
Cincinnati (Ohio) Grinders Incorporated.
Landis Tool Co., Waynesboro, Pa.
Norton Co., Worcester, Mass.
Thompson Grinder Co., Springfield, Ohio.

GRINDING MACHINES—Valve
Landis Tool Co., Waynesboro, Pa.

GRINDING WHEELS
Bakelite Corp., 247 Park Ave., N. Y. C.
Blanchard Machine Co., The, Cambridge, Mass.
Carborundum Co., The, Niagara Falls, N.Y.
Macklin Co., Jackson, Mich.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Norton Co., Worcester, Mass.

GRINDING WHEELS—Segment
Blanchard Machine Co., The, Cambridge, Mass.

GRIT—Steel
Pittsburgh (Pa.) Crushed Steel Co.

HACK SAW BLADES—See Saws—Hack Saw Blades

HACK SAW MACHINES
Armstrong-Blum Mfg. Co., Chicago.
Peerless Mch. Co., Racine, Wis.

HAMMER BOARDS
Irwin, H. G., Lumber Co., 1129 State St., Erie, Pa.

HAMMERS—Air, Forging
Nazel Engineering & Machine Works, Philadelphia.

HAMMERS—Chipping & Riveting—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Drop
Billings & Spencer Co., Hartford, Conn.
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.
Standard Machinery Co., Providence, R. I.

HAMMERS—Helve
Bradley, C. C., & Son, Inc., Syracuse, N. Y.

HAMMERS—Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.
Ingersoll-Rand Co., 11 Broadway, New York City.

HAMMERS—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.
Wodack Electric Tool Corp., Chicago.

HAMMERS—Power
Bradley, C. C., & Son, Inc., Syracuse, N. Y.
Chambersburg (Pa.) Engineering Co.

HAMMERS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., 1306 Elson Ave.

HAMMERS—Steam
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Morgan Engineering Co., The, Alliance, O.

HANGERS—Ball Bearing
S K F Industries, Inc., Front St. & Erie Ave., Phila., Pa.

HANGERS—Roller Bearing
Hyatt Bearings Div., General Motors Corp., Newark, N. J.

HEADING MACHINES
Ajax Mfg. Co., The, Euclid, Ohio.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

HEADS—Spun and Pressed
Central Iron & Steel Co., Harrisburg, Pa.
Worth Steel Co., Claymont, Del.

HEADS—Steel—Flanged & Dished
Central Iron & Steel Co., Harrisburg, Pa.

HEAT RESISTING PRODUCTS—Electric
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
General Machine Wks., York, Pa.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Holden, A. F., Co., New Haven, Conn.
Pariah Pressed Steel Co., Reading, Pa.

HEAT TREATING COMPOUNDS
Holden, A. F., Co., New Haven, Conn.

HEAT TREATING EQUIPMENT — Air Draw
Holden, A. F., Co., New Haven, Conn.
Machler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

HEATERS—Unit
Dravo Corp., Pittsburgh.

HEATING RESISTANCE — Non-Metallic
Globar Div., The Carborundum Co., Niagara Falls, N. Y.
Holden, A. F., Co., New Haven, Conn.

HOISTS—Air
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Detroit (Mich.) Hoist & Mach. Co.
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Northern Engineering Works, Detroit.
Ridgway, Craig & Son Co., Coatesville, Pa.

HOISTS—Chain
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric
American Engineering Co., Philadelphia.
Detroit (Mich.) Hoist & Mach. Co.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Maris Brothers, Inc., Philadelphia.
Northern Engineering Works, Detroit, Mich.
Philadelphia (Pa.) Gear Works.
Robbins & Myers, Inc., Springfield, Ohio.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Wright Mfg. Div., American Chain & Cable Co., Inc., York, Pa.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

HOISTS—Electric Traveling
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

HOISTS—Monorail
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

HOISTS—Scraper
Sullivan Machinery Co., Claremont, N. H.

HOSE—Air, Oil, Steam and Water
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

HOSE—Flexible Metallic
American Brass Co., The, Waterbury, Conn.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

HOSE—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

HYDRANTS—Fire
Wood, R. D., & Co., Philadelphia.

HYDRAULIC MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farquhar, A. B., Co., Ltd., York, Pa.
Hydraulik Gmbh, Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Morgan Engineering Co., The, Alliance, O.
Wood, R. D., & Co., Philadelphia.

INGOT MOLDS
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.
Valley Mould & Iron Corp., Hubbard, Ohio.

Products Index

INGOTS—Aluminum
Aluminum Co. of America, Pittsburgh.
Seligman, Arthur, & Co., Inc., 30 Rockefeller Plaza, R. C. A. Bldg., N. Y. C.

INGOTS—Phosphor Bronze
Phosphor Bronze Smelting Co., The, Phila.

INHIBITORS
American Chemical Paint Co., Ambler, Pa.
Du Pont de Nemours, E. I., & Co., Inc. Grasselli Chemicals Dept., Wilmington, Del.

INSTRUMENTS—Electric
Weston Electrical Instrument Corp., Newark, N. J.

INSTRUMENTS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

INSULATION
Johns-Manville Corp., 22 East 40th St., New York City.

IRON—Rustless
Ludlum Steel Co., Watervliet, N. Y.

JIGS, FIXTURES, DIES, etc. (See Dies, Jigs, Fixtures, etc.)

KEYS—Riveted
Western Wire Prods. Co., St. Louis, Mo.

KEYSEATING MACHINES
Baker Bros., Inc., Toledo, Ohio.
Davis Keyseater Co., 460 Exchange St., Rochester, N. Y.

LACING—Belt, Rawhide or Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LAGGING—Insulating
Quigley Co., Inc., 56 West 45th St., N. Y. C.

LAMPS—Filament
General Electric Co., Cleveland.

LAMPS—Mercury Vapor
General Electric Vapor Lamp Co., Hoboken, N. J.

LAPPING MACHINES
Cincinnati (Ohio) Grinders Incorporated.

LATHES—Automatic
Baird Mch. Co., The, Brideport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Goss & De Leeuw Mch. Co., New Britain, Conn.
Jones & Lamson Mch. Co., Springfield, Vt.
LeBlond, R. K., Mch. Tool Co., Cincinnatti.
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Automatic Vertical
Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.

LATHES—Bench
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
Rivett Lathe & Grinder, Inc., Boston, Mass
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Brass
Warner & Swasey Co., The, Cleveland.

LATHES—Chucking
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES—Contour Turning
Monarch Mch. Tool Co., The, Sidney, O.

LATHES—Crankshaft
LeBlond, R. K., Mch. Tool Co., Cincinnati.

LATHES—Engine
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Roll
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Pitgh.

LATHES — Second-Hand. (See Clearing House Section)

LATHES—Toolroom
LeBlond, R. K., Machine Tool Co., Cincinnati, Ohio.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.
South Bend (Ind.) Lathe Works, 595 East Madison St.

LATHES—Turret
Acme Machine Tool Co., Cincinnati.
Bardons & Oliver, Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., The, Cleveland.

LATHES, Turret, Vertical
Bullard Co., The, Bridgeport, Conn.
Rogers Machine Wks., Alfred, New York.

LAYOUT FLUID
Dayton Rogers Mfg. Co., Minneapolis, Minn.

LEAD LININGS
Dietzel Lead Burning Co., Pittsburgh.
National Lead Co., 111 Bdway., N. Y. C.

LEAD—In Oil
National Lead Co., 111 Bdway., N. Y. C.

LEAD—Tellurium
National Lead Co., 111 Bdway., N. Y. C.

LEATHER—Cup
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

LEGGINS—Safety
Safety Equipment Service Co., Cleveland.

LEVELING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

LOCK WASHER MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

LOCOMOTIVES—Electric
Atlas Car & Mfg. Co., The, Cleveland.
Davenport (Iowa) Locomotives Works.
General Electric Co., Schenectady, N. Y.

LOCOMOTIVES—Gas-Electric
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Industrial
Davenport (Iowa) Locomotives Works.

LOCOMOTIVES—Steam
Iron & Steel Products, Inc., Chicago.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., The, Cleveland.

LUBRICANTS—Crusher & Grinding
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Gear
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—High Pressure & Temperature
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mine Cars
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Mining Machines
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Railroad
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Roll Neck—Anti-Friction & Plain
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

LUBRICANTS—Tipple & Cleaning
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco; Shell Bldg., St. Louis, and 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

INDUSTRIAL HEATING ENGINEERS

DESIGNING CONSULTING CONTRACTING

Guaranteed results on recommendations for new or improved equipment—processes—methods for any heating problem.

FLINN AND DREFFEIN CO.
308 W. Washington St. Chicago, Ill.

BELMONT IRON WORKS
PHILADELPHIA NEW YORK EDDYSTONE
Engineers-Contractors-Exporters
STRUCTURAL STEEL—BUILDINGS AND BRIDGES
RIVETED—ARC WELDED
BELMONT INTERLOCKING CHANNEL FLOOR
Write for Catalogue
Main Office: Phila., Pa. New York Office: 44 Whitehall St.

H. A. BRASSERT & CO.
CONSULTING ENGINEERS
for Iron, Steel,
Fuel and Heavy Metallurgical Industries.
PROJECTS, PLANT DESIGN
CONSTRUCTION, OPERATION
MARKETS, FINANCE
AND MANAGEMENT
310 South Michigan Ave. Chicago, Ill.

THE
TORRINGTON
SWAGING MACHINE
—with 4000 forceful squeezing hammer blows per minute — makes metal tougher and more elastic. Send for booklet—"The Modern Art of Swaging."
THE TORRINGTON CO., Standard Plant
55 Field Street Torrington, Conn., U. S. A.

WIRE AND METAL RIBBON
FORMING MACHINERY
NILSON TILTING
WIRE REELS
(Wire Reel Catalog No. 51)
Special Machines Designed and Built to Order
THE A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.

MOORE RAPID
LECTROMELT FURNACES
For the rapid and economic melting and refining of gray and malleable irons, carbon and alloy steels, etc.
PITTSBURGH LECTROMELT FURNACE CORPORATION
P. O. Box 1257 Pittsburgh, Pa.

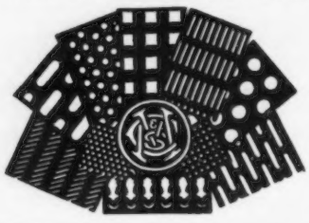
MUNDT

PERFORATED METALS

The few perforations illustrated are indicative of the wide variety of our line—*we can perforate almost any size perforation in any kind of metal or material required.* Send us your specifications.

Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

Write for Catalog of Patterns



TIN, STEEL, COPPER, ALUMINUM, BRONZE, BRASS, ZINC, ANY METAL, ANY PURPOSE

CHARLES MUNDT & SONS
59 FAIRMOUNT AVE., JERSEY CITY, N. J.

HENDRICK

PERFORATED METALS

Perforated Metal Screens in Steel, Bronze, Stainless Steel, Monel, Aluminum, Everdur and other metals. Perforated Grilles in various metals and many special designs. Mitco Open Steel Flooring, Mitco Shur-Site Treads, Mitco Armorgrids; also elevator buckets, conveyor troughs and products fabricated from heavy plate. Write for catalog.

HENDRICK MFG. CO., 37 Dundaff St., Carbondale, Pa.
Sales Offices in Principal Cities
Please Consult Telephone Directory

PERFORATED METALS—SCREENS

Any size perforation — any gauge steel.
Promptly made to your exact specifications.

CHICAGO PERFORATING CO.
2440 W. 24TH PLACE *Tel Canal 1439* CHICAGO, ILL.

ROLL LATHES

The Hyde Park kind are manufactured from correctly made castings of heavy and rigid construction and built to last many years. Handled by an experienced mill man. Tell us when you expect to place your next order.

ROLLS *(Sand and Chilled)* ROLL LATHES
IRON CASTINGS, TIN PLATE MACHINERY

HYDE PARK FOUNDRY & MACHINE CO.
HYDE PARK (Conemaugh Div. P. R. R.) PA.

Products Index

MACHINE GUARD MATERIALS
Erdle Perforating Co., Rochester, N. Y.

MACHINE WORK
General Machine Works, York, Pa.
Gifford-Wood Co., Hudson, N. Y.
Houde Engineering Corp., Buffalo, N. Y.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.

MACHINERY DEALERS — Second-Hand, (See Clearing House Section)

MACHINISTS' SMALL TOOLS
Brown & Sharpe Mfg. Co., Providence, R. I.
Starrett, L. S., Co., Athol, Mass.

MAGNESITE—Brick or Dead Burnt
Carborundum Co., The, Perth Amboy, N. J.

MAGNESIUM
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

MAGNETS—Lifting
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleve.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

MALLETS—Rawhide
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

MANDRELS—Expanding
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

MANGANESE METAL AND ALLOYS
Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

MANHOLE FITTINGS AND SADDLES
Worth Steel Co., Claymont, Del.

MANIFOLDS—Oxygen & Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

MARKING MACHINES
Noble & Westbrook Mfg. Co., The, East Hartford, Conn.

METAL SPECIALTIES
Crosby Co., The, Buffalo, N. Y.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

METAL—Thermostatic Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

METALS—Coating
Metals Coating Co. of America, Phila., Pa.

METERS—Electric Welding
Lincoln Electric Co., The, Cleveland.

METERS—Flow
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

METERS—Water & Oil
Worthington Pump & Machinery Corp., Harrison, N. J.

MICA SCHIST
Edge Hill Silica Rock Co., New Brunswick, New Jersey.

MICROMETERS
Starrett, L. S., Co., Athol, Mass.

MICROMETERS—Automatic, for Rolling Mills
Haines Gauge Co., The, Phila., Pa.

MILLING MACHINES—Automatic
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MILLING MACHINES—Planer Type
Cincinnati (Ohio) Planer Co.

MILLING MACHINES — Second - Hand, (See Clearing House Section)

MILLING MACHINES—Vertical
Brown & Sharpe Mfg. Co., Prov., R. I.
Cincinnati (Ohio) Milling Mch. Co., The.

MOLDING MACHINES
Tabor Mfg. Co., Phila., Pa.

MOLYBDENUM
Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

MONEL METAL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

MONORAIL SYSTEMS—Hand & Electric
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.

MOTORS—Electric
Allis-Chalmers Mfg. Co., Milwaukee.
Century Electric Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., Cleveland.
Reliance Electric & Engineering Co., Cleveland.
Westinghouse Elec. & Mfg. Co., E. Ptgh.

MOTORS—Electric, Second-Hand. (See Clearing House Section)

MUFFLES—Alloy
Electro Alloys Co., Elyria, Ohio.

NAILS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Youngstown (Ohio) Sheet & Tube Co., The.

NIBBLING MACHINES
Gray Machine Co., Philadelphia.

NICKEL
International Nickel Co., Inc., The, 67 Wall St., N. Y. C.

NICKEL ANODES—Rolled or Cast
Seymour (Conn.) Mfg. Co.

NICKEL SILVER
Seymour (Conn.) Mfg. Co.

NITROGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.

NOZZLES—Sand Blasting
Norton Co., Worcester, Mass.

NUMBERING MACHINES—For Metal
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

NUT MACHINERY — Automatic Cold Pressed
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

NUTS—Acorn
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Castellated
National Acme Co., The, Cleveland.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Cold Punched
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hot Pressed
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Lock
Standard Pressed Steel Co., Jenkintown, Pa.

NUTS—Machine Screw
Blake & Johnson Co., The, Waterville, Ct.

NUTS—Semi-Finished
Cleveland (Ohio) Cap Screw Co., The.
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Thumb Malleable
Republic Steel Corp., Upson Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Wing
Parker-Kalon Corp., 196 Varick St., N. Y. C.

OIL & GREASE SEALS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL RETAINERS
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

OIL STONES
Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester, Mass.

OILS—Cutting
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Fuel
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago, Ill.
Sun Oil Co., Philadelphia.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Lubricating
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, N. Y. C.
Standard Oil Co. (Indiana), Chicago.
Texas Company, The, 135 East 42nd St. N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

OILS—Soluble—See Oils—Cutting

ORES—Iron
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Shenango Furnace Co., Pittsburgh.
Snyder, W. P., & Co., Pittsburgh.

OVENS—Coke and By-Product Recovery
Koppers Co., Pittsburgh.

OVENS—Core and Mold
Herrington & Randall, Inc., Detroit.
Holcroft & Co., Detroit.
Monarch Engineering & Mfg. Co., The, Baltimore, Md.

OVENS—Cross Regenerative
Koppers Co., Pittsburgh.

Products Index

OVENS—Enameling and Japanning
Carborundum Co., The, Perth Amboy, N. J.
Herrington & Randall, Inc., Detroit.
Maehler, Paul Co., The, Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo.

OXY-ACETYLENE — Shape-Cutting Machines
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

OXYGEN
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

PACKING—Felt
American Felt Co., 315 Fourth Ave., N. Y. C.

PACKING—Hydraulic
Rhoads, J. E. & Sons, Philadelphia.

PACKING—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Rhoads, J. E., & Sons, Philadelphia.

PACKING—Metallic
Garlock Packing Co., The, Palmyra, N. Y.

PACKING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

PACKING—Sheet, Asbestos or Rubber
Garlock Packing Co., The, Palmyra, N. Y.
Johns-Manville Corp., 22 East 40th St., New York City.

PAINT
Midland Paint & Varnish Co., The, Cleveland.
National Lead Co., 111 Bdway., N. Y. C.

PAINT STICKS
Helmer & Staley, Inc., Chicago, Ill.

PERFORATED METAL
Chicago Perforating Co., 2440 W 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

PHOSPHOR—Copper
Phosphor Bronze Smelting Co., The, Phila.

PICKLING COMPOUNDS
American Chemical Paint Co., Ambler, Pa.

PICKLING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Mesta Mch. Co., Pittsburgh.

PICKLING TANK LININGS
Ceilcote Co., The, Cleveland.
Keagler Brick Co., Steubenville, Ohio.
National Lead Co., 111 Bdway., N. Y. C.

PICKLING TANK STEAM JETS
Dietzel Lead Burning Co., Pittsburgh.
Durion Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

PIG IRON
Bethlehem (Pa.) Steel Co.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Hanna Furnace Corp., The, Detroit, Mich.
Pickands Mather & Co., Cleveland.
Republic Steel Corp., Cleveland, Ohio.
Shenango Furnace Co., Pittsburgh.
Shenango-Penn Mold Co., Pittsburgh.
Superior Charcoal Iron Co., Grand Rapids, Mich.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

PIG IRON—Charcoal
Superior Charcoal Iron Co., Grand Rapids, Mich.

PILING—Steel Pipe
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PILING—Steel Sheet
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.

PINIONS—Rolling Mill
Mesta Mch. Co., Pittsburgh.

PINIONS—Wire and Rod
Rathbone, A. R. & J., Palmer, Mass.

PINS—Cotter
Lamson & Sessions Co., The, Cleveland.

PIPE—Acid Resisting
Haveg Corporation, Newark, Delaware.

PIPE—Cast Iron, B. & S. and Flanged
Wood, R. D., & Co., Philadelphia.

PIPE—Hammer Welded
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

PIPE—Lead
National Lead Co., 111 Bdway., N. Y. C.

PIPE—Lead Lined
National Lead Co., 111 Bdway., N. Y. C.

PIPE—New and Second-Hand
Albert & Davidson Pipe Corp., 2nd Ave., 50-51st St., Bklyn., N. Y.
Albert Pipe Supply Co., Inc., Berry and N. 13th St., Bklyn., N. Y.
Greenpoint Iron & Pipe Co., Inc., Stagg & Bogart Sts., Bklyn., N. Y.

PIPE—Seamless Brass or Copper
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

PIPE—Spiral Welded
American Rolling Mill Co., Middletown, O.
Crane Co., Chicago.

PIPE—Standard, Black and Galvanized
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

PIPE—Welded, Electric
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.

PIPE COVERING—Asbestos
Johns-Manville Corp., 22 East 40th St., New York City.

PIPE FITTINGS
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.

PIPE THREADING & CUTTING MACHINES
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Jarecki Mfg. Co., Erie, Pa.
Landis, Mach. Co., Inc., Waynesboro, Pa.
Merrell Mfg. Co., Toledo.
Murchey Machine & Tool Co., Detroit.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.

PLANERS
Cincinnati (Ohio) Planer Co.

PLANING MACHINES — Second Hand. (See Clearing House Section)

PLASTICS—Laminated
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS — Laminated or Molded Phenolic
Richardson Co., The, Melrose Park, Ill.

PLASTICS—Molded
Bakelite Corp., 247 Park Ave., N. Y. C.

PLASTICS—Synthetic
Bakelite Corp., 247 Park Ave., N. Y. C.

PLATER'S CLEANING COMPOUND
American Chemical Paint Co., Ambler, Pa.

PLATES—Floor or Cellar Door
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Inland Steel Co., Chicago.

PLATES—Iron or Steel
Alan Wood Steel Co., Conshohocken, Pa.
American Pressed Steel Co., Phila., Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Central Iron & Steel Co., Harrisburg, Pa.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Ryerson, Joseph T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.
Youngstown (Ohio) Sheet & Tube Co., The.

PLATFORMS—Skid
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

PLUGS—Core Hole
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.

POLISHING & BUFFING MACHINES—Automatic
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES
Continental Machine Specialties, Inc., Minneapolis, Minn.
Packer Machine Co., The, Meriden, Conn.

POLISHING MACHINES—Bar
Medart Co., The, St. Louis, Mo.

POLISHING MACHINES—Belt
Production Machine Co., Greenfield, Mass.

POTS—Lead, Cyanide or Carbon
Electro Alloys Co., Elyria, Ohio.

POWER UNITS—Rotary
Cushman Chuck Co., Hartford, Conn.
New Departure Div., General Motors Corp., Bristol, Conn.

POWER UNITS—Straight Line
Cushman Chuck Co., Hartford, Conn.

PRECIPITATORS—Electrostatic Dust
Pangborn Corporation, Hagerstown, Md.

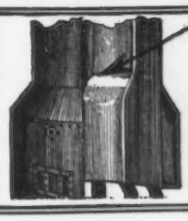
PRESS FEEDS—Automatic
Littell, F. J., Mch. Co., Chicago.

PRESSED METAL PARTS
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Crosby Co., The, Buffalo, N. Y.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

PRESSED STEEL PARTS
Crosby Co., The, Buffalo, N. Y.
Lansing (Mich.) Stamping Co., So. Penn Ave.
Parish Pressed Steel Co., Reading, Pa.
Toledo (Ohio) Stamping & Mfg. Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.

PRESSES—Automatic
Henry & Wright Mfg. Co., The, Hartford, Conn.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
V & O Press Co., Hudson, N. Y.

A BAG—or a Truck Load?
FOR LOWEST
BLAST CLEANING COSTS
One bag of "Certified" Steel Grit, or Steel Shot, will do the work of a Truckload of Sand! . . . and do it quicker, at lower cost per ton, with less dust, than any other abrasive on the market. If you are interested in reduced cleaning costs and greater profits—use "CERTIFIED" STEEL ABRASIVES.
SAND
PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.
STEEL SHOT AND GRIT CO.
BOSTON, MASS.

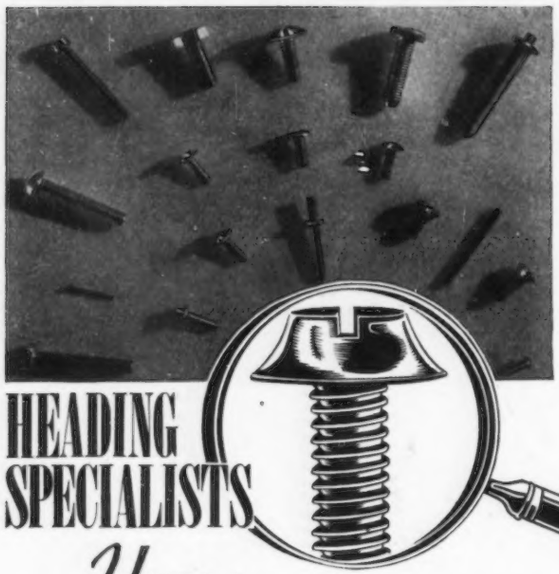

Mica Schist Lining Fuses Into One Piece
Large blocks make placement easy and rapid—flat, thin pieces for patching—pulverized for cement or daub. No waste. A practical and economical lining.
EDGE HILL SILICA ROCK CO.
NEW BRUNSWICK, N. J.

SINCE 1832
Bradley
The name to remember for CUSHIONED POWER HAMMERS
C.C. BRADLEY & SON, INC. Syracuse, N.Y.

SURE WE CAN HANDLE THAT JOB

I SAW A GOOD WAY TO DO IT IN FLASHES, THE MONTHLY PUBLICATION OF RESISTANCE WELDING NEWS, IDEAS AND INFORMATION SENT FREE ON REQUEST BY
THOMSON-GIBB ELECTRIC WELDING CO., LYNN, MASS.

NAILS MADE TO ORDER IN ANY METAL
JOHN HASSALL, INC. EST. 1850 CLAY & OAKLAND STS., BROOKLYN, N.Y.



HEADING SPECIALISTS

Users of made-to-order screws and headed parts are daily discovering real economies in PROGRESSIVE cold upset products. They have found that many parts now made by screw machines can be uniformly headed with our modern equipment at substantial savings in dollars and time. It will pay you to consult our specialists about your fastening requirements.

QUALITY PROMCO BRAND

The PROGRESSIVE MFG. CO.
TORRINGTON · · · CONNECTICUT

SCREW MACHINE PRODUCTS
CAP AND SET SCREWS
WM. H. OTTEMILLER CO., Inc.
Pattison St. & M & PRR York, Pa.

SCREW MACHINE PRODUCTS
ACCURATELY MADE AT A FAIR PRICE
ARE MORE ECONOMICAL
Specialists in the production of screw machine products for 15 years. Let us quote on your requirements.
Screw Machine Products Corp., 1014 Eddy St., Providence, R.I.

Pats. Pend'g
UNBRAKO
FREE SAMPLES FOR DOUBTING THOMASES
DEALERS EVERYWHERE—PROMPT DELIVERIES
STANDARD PRESSED STEEL CO.
Box 523 Jenkintown, Pa.

PARKER-KALON
Cold-forged CAP NUTS
Superior in strength, finish, appearance, uniformity. Get samples and prices. Compare!
Parker-Kalon Corp., 200 Varick St. New York

Products Index

PRESSES—Baling
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Baling, Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Galland-Henning Mfg. Co., Milwaukee.

PRESSES—Coining
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Drop—See Hammers—Drop

PRESSES—Foot
Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

PRESSES—Forging
Ajax Mfg. Co., The, Euclid, Ohio.
Hydraulik Gmbh, Duisburg, Germany.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.

PRESSES—Forming and Bending
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mch. & Tool Wks., Buffalo, N. Y.
U. S. Tool Co., Inc., Ampere, N. J.

PRESSES—Friction Screw
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.
Elmes, Chas. F., Engng. Wks., Chicago.
Farquhar, A. B., Co., Ltd., York, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., Chicago.
Hydraulik Gmbh, Duisburg, Germany.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Oilgear Co., The, 1311 W. Bruce, Milwaukee.
Wood, R. D., & Co., Philadelphia.

PRESSES—Power
Baird Mch. Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyman, Joseph, & Sons, Phila.
Manville, E. J., Mch. Co., Waterbury, Ct.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo N.Y.
Perk, Stow & Wilcox Co., The, Southington, Conn.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Standard Machinery Co., Providence, R. I.
U. S. Tool Co., Inc., Ampere, N. J.
V & O Press Co., Hudson, N. Y.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Trimming
Chambersburg (Pa.) Engineering Co.
Erie (Pa.) Foundry Co.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

PULLEYS—Iron, Solid & Split
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd., Chicago.

PULLEYS—Magnetic
Cutler-Hammer, Inc., Milwaukee.

PULLEYS—Vacuum Cup
Vacuum Cup Metal Pulley Co., Inc., Detroit, Mich.

PULVERIZERS
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.
Whiting Corp., Harvey, Ill.

PUMPS—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
Haveg Corporation, Newark, Delaware.

PUMPS—Boiler Feed
Aldrich Pump Co., The, Allentown, Pa.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.

PUMPS—Centrifugal
Aldrich Pump Co., The, Allentown, Pa.
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Ruthman Machinery Co., Cincinnati.
Tomkins-Johnson Co., The, Jackson, Mich.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Coolant
Ruthman Machinery Co., Cincinnati.

PUMPS—Electric
Fairbanks, Morse & Co., Chicago.

PUMPS—Hydraulic
Aldrich Pump Co., The, Allentown, Pa.
American Engineering Co., Philadelphia.
Elmes, Chas. F., Engng. Wks., Chicago.
Fairbanks, Morse & Co., Chicago.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Power
Fairbanks, Morse & Co., Chicago.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Rotary Positive, Centrifugal & Turbine
Crane Co., Chicago.

PUMPS—Steam
Fairbanks, Morse & Co., Chicago.
Ingersoll-Rand Co. (Cameron), 11 Broadway, N. Y. C.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS—Vacuum
Pennsylvania Pump & Compressor Co., Easton, Pa.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUNCHES & DIES
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

PUNCHING AND SHEARING MACHINES
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Excelsior Tool & Mach. Co., E. St. Louis, Ill.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Niagara Machine & Tools Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Thomas Mach. Mfg. Co., Pittsburgh.

PYROMETERS—Indicating
Brown Instrument Co., The, Philadelphia, Pa.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., Philadelphia.

RAILS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Foster, L. B., Co., Inc., Pittsburgh.
Frank, M. K., 480 Lexington Ave., N. Y. C.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.

RAILS—Relaying
Hyman-Michaels Co., Chicago.
Iron & Steel Products, Inc., Chicago.
Sherwood, E. C., 50 Church St., N. Y. C.

RAILWAY EQUIPMENT & SUPPLIES
Fairbanks, Morse & Co., Chicago.
Iron & Steel Products, Inc., Chicago.

REAMERS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

REAMING MACHINES
Blanchard Machine Co., The, Cambridge, Mass.

RECORDERS—Furnace Atmosphere
Brown Instrument Co., The, Philadelphia, Pa.

REELS—For Coil Stock
Littell, F. J., Mch. Co., Chicago.

REFRACTORIES
Babcock & Wilcox Co., The, 85 Liberty St., New York City.
Cleveland (Ohio) Quarries Co., The.
Illinois Clay Products Co., Joliet, Ill.
West Virginia Fire Clay Mfg. Co., Pittsburgh.

REGULATORS—Compressed Gas
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

REINFORCEMENT FARRIC—Concrete
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

RETORTS—Alloy
Electro Alloys Co., Elyria, Ohio.

RINGS—Iron or Steel
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Co., Burnham, Pa.

RINGS—Welded
American Welding & Mfg. Co., Warren, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland.
Manville, E. J., Mch. Co., Waterbury, Ct.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

RIVET SETS
Cleveland Steel Tool Co., The, 660 E. 82d St., Cleveland, Ohio.

RIVETING MACHINES
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Hannifin Mfg. Co., Chicago.
Shuster, F. B., Co., The, New Haven, Ct.
Tomkins-Johnson Co., The, Jackson, Mich.

RIVETS
Blake & Johnson Co., The, Waterville, Ct.
Clark Bros. Bolt Co., Milldale, Conn.
Hassall, John, Inc., Clay & Oakland Sts., Bklyn., N. Y.
Progressive Mfg. Co., Torrington, Conn.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

RODS—Aluminum
Aluminum Co. of America, Pittsburgh.

RODS—Brass
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

RODS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave. Midland, Mich.

RODS—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Seymour (Conn.) Mfg. Co.

RODS—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

Products Index

RODS—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

RODS—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Brass Co., The, Waterbury, Conn.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Electric Arc Cutting & Welding Co., The, Newark, N. J.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Una Welding, Inc., Cleveland, Ohio.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

RODS—Wire
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Bethlehem (Pa.) Steel Co.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

ROLLING MACHINERY—Cold Rolling
Cold Metal Process Co., The, Youngstown, Ohio.
Lewis Foundry & Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

ROLLING MACHINERY—Sheet Metal
Lewis Foundry & Mch. Co., Pittsburgh.

ROLLING MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Farrel-Birmingham Co., Inc., Ansonia, Ct.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.
Morgan Engineering Co., The, Alliance, O.
National Roll & Fdry. Co., Avonmore, Pa.
Standard Machinery Co., Providence, R. I.
United Engineering & Fdry. Co., Ptgh.
Waterbury (Ct.) Farrel Fdry. & Mch. Co. The.

ROLLING MILLS—Copper Rod & Sheet
Torrington (Conn.) Mfg. Co., The.

ROLLS—Alloy Steel
Pittsburgh (Pa.) Rolls Corp.

ROLLS—Bending and Straightening
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Bertsch & Co., Cambridge City, Ind.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

ROLLS—Rubber Covered
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

ROLLS—Sand Chilled Iron and Steel
Aetna-Standard Engineering Co., The Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Hyde Park (Pa.) Fdry. & Mch. Co.
Lewis Foundry & Mch. Co., Pittsburgh.
Mackintosh-Hemphill Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
National Roll & Fdry. Co., Avonmore, Pa.
Pittsburgh (Pa.) Rolls Corp.
United Engineering & Fdry. Co., Ptgh.

ROLLS—Special Hardened
Midvale Co., The Nicetown, Phila., Pa.

ROOFING—Special Copper Bearing Steel
Superior Sheet Steel Co., Canton, Ohio.

ROOFING AND SIDING—Corrugated and Plain
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Johns-Manville Corp., 22 East 40th St., New York City.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

ROOFING AND SIDING—Iron and Steel
Inland Steel Co., Chicago.

ROOFING & SIDING—(Zinc)—Corrugated & Plain
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

RUBBER LININGS
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.

RUBBER MOLDED PARTS
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Richardson Co., The, Melrose Park, Ill.

RUST PREVENTIVES
American Chemical Paint Co., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Midland Paint & Varnish Co., The, Cleveland.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING COMPOUNDS
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.

RUST PROOFING PROCESS
American Chemical Paint Co., Ambler, Pa.
Parker Rust-Proof Co., 2186 Milwaukee Ave., Detroit.
Udylite Co., The, Detroit.

SAND BLAST EQUIPMENT AND MACHINES
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Panghorn Corporation, Hagerstown, Md.

SAND BLAST STEEL SHOT
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.
Pittsburgh (Pa.) Crushed Steel Co.

SAND HANDLING EQUIPMENT
Bartlett, C. O.-Snow Co., The, Cleveland.

SAWING MACHINES—Metal
Espen-Lucas Mch. Works, Phila.
Peerless Mch. Co., Racine, Wis.
Tannewitz Works, The, Grand Rapids, Mich.

SAWING MACHINES—Metal-Band
Continental Machine Specialties, Inc., Minneapolis, Minn.
Tannewitz Works, The, Grand Rapids, Mich.

SAWS—Band and Hack for Metal
Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.
Tannewitz Works, The, Grand Rapids, Mich.
Wells Mfg. Corp., Three Rivers, Mich.

SAWS—Circular, Rip & Cutoff
Atkins, E. C., & Co., Indianapolis.

SAWS—Friction
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Hack Saw Blades
Atkins, E. C., & Co., Indianapolis.
Peerless Mch. Co., Racine, Wis.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Sons, Inc., Philadelphia.
Tabor Mfg. Co., Philadelphia.

SAWS—Milling
Atkins, E. C., & Co., Indianapolis.
Disston, Henry, & Sons, Inc., Philadelphia.

SAWS—Portable Electric
Black & Decker Mfg. Co., The, Towson, Md.

SCALES
Exact Weight Scale Co., Columbus, Ohio.
Fairbanks, Morse & Co., Chicago.
Streeter-Amet Co., Chicago.

SCREENS—Perforated Metal
Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.

SCREENS—Woven Wire
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SCREW MACHINE PRODUCTS
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Blake & Johnson Co., The, Waterville, Ct.
Commonwealth Brass Corp., Detroit.
Eastern Mch. Screw Corp., New Haven.
Houde Engineering Corp., Buffalo, N. Y.
National Acme Co., The, Cleveland.
Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Peck Spring Co., The, Plainville, Conn.
Progressive Mfg. Co., Torrington, Conn.
Screw Mch. Products Corp., Prov., R. I.

SCREW MACHINERY—Automatic
Brown & Sharpe Mfg. Co., Providence, R. I.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW MACHINERY—Hand
Warner & Swasey Co., The, Cleveland.

SCREW MACHINERY—Multiple Spindle
Acme Machine Tool Co., Cincinnati.
Cone Automatic Mach. Co., Inc., Windsor, Vt.
National Acme Co., The, Cleveland.

SCREW PLATES
Greenfield (Mass.) Tap & Die Corp.

SCREW STOCK
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SCREWS—Cap
Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The Cleveland.
National Acme Co., The, Cleveland
Ottemiller, Wm. H., Co., Inc., York, Pa.

SCREWS—Coach or Lag
Lamson & Sessions Co., The, Cleveland.

SCREWS—Machine
Blake & Johnson Co., The, Waterville, Ct.
Lamson & Sessions Co., The, Cleveland.
Progressive Mfg. Co., The, Torrington, Ct.

SCREWS—Safety Set
Progressive Mfg. Co., The, Torrington, Ct.
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Set
Cleveland (Ohio) Cap Screw Co., The.
National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York, Pa.

Send to GIBSON for advice or a quotation
WM. D. GIBSON COMPANY
DIVISION OF ASSOCIATED SPRING CORPORATION
1800 CLYBOURN AVE. • CHICAGO, ILL.

M. D. HUBBARD Pres. P. M. HUBBARD J. A. HUBBARD Sec.
M·D·Hubbard Spring Company
750 CENTRAL AVE., PONTIAC, MICH.

Products Index

SCREWS, Socket, Head, Cap
Standard Pressed Steel Co., Jenkintown, Pa.

SCREWS—Thumb
Parker-Kalon Corp., 196 Varick St., N. Y.

SCRUBBING MACHINES—Sheet
Wean Engineering Co., Inc., The, Warren, Ohio.

SCYTHE STONES AND WHETSTONES
Carborundum Co., The, Niagara Falls, N.Y.

SECOND - HAND MACHINERY—(See Clearing House Section)

SEPARATORS—Magnetic
Dings Magnetic Separator Co., Milkauwee.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

SHAFTING—Cold Drawn
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Forged
Bay City Forge Co., Erie, Pa.

SHAFTING—Steel
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

SHAFTING—Turned and Ground
Bliss & Laughlin, Inc., Harvey, Ill.
Ryerson, Jos. T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPERS
Cincinnati (Ohio) Shaper Co., The.

SHAPERS—Vertical
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

SHAPES—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Wire
American Spring & Mfg. Corp., Holly, Mich.
Cuyahoga Spring Co., The, Cleveland.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Roebling's, John A. Sons Co., Trenton, N. J.

SHEAR BLADES & KNIVES
American Shear Knife Co., Homestead, Pa.
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Alligator
Canton Fdry. & Mch. Co., Cleveland.

SHEARING MACHINES—Angle, Hand and Power
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

SHEARING MACHINES—Bar
G. D. S. Machinery & Supply Co., Inc., 101 Walker St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Ptgh.

SHEARING MACHINES — Beam and Channel
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Ptgh.

SHEARING MACHINES—Billet
Morgan Engineering Co., The, Alliance, O.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Ptgh.

SHEARING MACHINES — Continuous Sheet & Pack
Aetna-Standard Engineering Co., The, Youngstown, Ohio.

SHEARING MACHINES—Plate
Bertsch & Co., Cambridge City, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pels, Henry, & Co., Inc., 90 West St., N. Y. C.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
United Engineering & Fdry. Co., Ptgh.

SHEARING MACHINES — Sheet and Plate
Beatty Mch. & Mfg. Co., 936—150th St., Hammond, Ind.
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARING MACHINES—Squaring
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Co., Chicago.
Niagara Mach. & Tool Wks., Buffalo, N. Y.

SHEARS—Hand for Sheet Metal
Bremil Mfg. Co., Erie, Pa.

SHEET BARS
Jones & Laughlin Steel Corp., Pittsburgh.

SHEET METAL MACHINERY
Cincinnati (Ohio) Shaper Co., The.
Dreis & Krump Mfg. Co., Chicago.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Mach. & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., The, Southington, Conn.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

SHEETS—Aluminum
Aluminum Co. of America, Pittsburgh.

SHEETS—Auto Body
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Black
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Granite City (Ill.) Steel Co.
Ingersoll Steel & Disc Co., Chicago.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

SHEETS—Blue Annealed
Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Ryerson, Jos. T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.
Worth Steel Co., Claymont, Del.

SHEETS—Brass, Bronze, Copper, Nickel, Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

SHEETS—Chrome
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Chrome Nickel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Cold Rolled
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos., T., & Son, Inc., Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Copper Alloy
American Brass Co., The Waterbury, Conn.

SHEETS—Copper Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Inland Steel Co., Chicago.

SHEETS—Electrical
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio

SHEETS—Enameling
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.

SHEETS—For Drawing and Stamping
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Superior Sheet Steel Co., Canton, Ohio.
Worth Steel Co., Claymont, Del.

SHEETS—Full Finished
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Galvanized, Flat and Corrugated
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

SHEETS—Lead
National Lead Co., 111 Bdway., N. Y. C.

SHEETS—Long Terne
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SHEETS—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

SHEETS—Metal Furniture
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Republic Steel Corp., Cleveland, Ohio.

SHEETS—Pickled
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Tin Mill Black
American Rolling Mill Co., Middletown, O.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SHEETS—Zinc
New Jersey Zinc Co., The, 160 Front St.,

SHELVING—Steel
Frick-Gallagher Mfg. Co., The, Wellston, Ohio.

SHOVELS—Mounted—See Cranes

SHUTTERS—Steel & Wood Bi-Folding
Kinnear Mfg. Co., Columbus, Ohio.

SILICO—MANGANESE
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SILICON METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SLINGS—Wire Rope
Murray Safety Sling Co., Inc., Pitts., Pa.
Roebling's, John A., Sons Co., Trenton, N. J.

SLOTTING MACHINES
Nazel Engineering & Machine Works, Philadelphia.

SOLVENTS—Oil & Grease
Detroit Rex Products Co., Detroit, Mich.

SPACING TABLES—Punching & Shearing
Thomas Mach. Mfg. Co., Pittsburgh.

SPECIAL MACHINERY
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Bullard Co., The, Bridgeport, Conn.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Farquhar, A. B., Co., Ltd., York, Pa.
Gifford-Wood Co., Hudson, N. Y.
Houde Engineering Corp., Buffalo, N. Y.
Manville, E. J., Mch. Co., Waterbury, Ct.
Morgan Engineering Co., The, Alliance, O.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Wood, R. D., & Co., Philadelphia.

SPECIALTIES—Rubber Covered & Lined
Goodrich, B. F., Co., The, Akron, Ohio.

SPEED REDUCERS
Boston Gear Wks, Inc., North Quincy, Mass.
Cleveland (Ohio) Worm & Gear Co.
Horsburgh & Scott Co., 5112 Hamilton Ave., Cleveland.
James, D. O., Mfg. Co., Chicago.
Jones, W. A., Fdry. & Mch. Co., 4401 Roosevelt Rd, Chicago.
Link-Belt Co., Chicago.
Philadelphia (Pa.) Gear Works.
Poole Foundry & Mch. Co., Baltimore, Md.

SPIEGELEISEN
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

SPIKES—Screw
Oliver Iron & Steel Corp., Pittsburgh.

SPIKES—Track
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

SPINDLES—Grinding
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

SPINDLES—Hollow Bored
American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.

SPLICE BARS
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

SPRAY FINISHING EQUIPMENT
DeVilbiss Co., The, Toledo, Ohio.

SPRAYERS—Metal
Metals Coating Co. of America, Phila., Pa.

SPRAYERS—Paint
DeVilbiss Co., The, Toledo, Ohio.

SPRING MAKING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington (Conn.) Mfg. Co., The.

SPRINGS—Car
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.

SPRINGS—Extension, Compression, Torsion or Flat
Amer. Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Cuyahoga Spring Co., The, Cleveland.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
Peck Spring Co., The, Plainville, Conn.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

SPROCKETS
Baldwin-Duckworth Chain Corp., Springfield, Mass.
Boston Gear Wks., Inc., North Quincy, Mass.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Morse Chain Co., Ithaca, New York.
Whitney Chain & Mfg. Co., Hartford, Ct.

STAMPINGS OR DRAWINGS—Metal
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Central Iron & Steel Co., Harrisburg, Pa.
Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.
Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.
Crosby Co., The, Buffalo, N. Y.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.
E S M C O Auto Products Corp., Bush Terminal Bldg. 27, Bklyn., N. Y.
Eastern Tool & Stpg. Co., Inc., Saugus, Mass.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Hubbard, M. D., Spring Co., 750 Central Ave., Pontiac, Mich.
Lansing (Mich.) Stamping Co., So. Penn. Ave.
Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.
Miller & Van Winkle, Inc., 18 Bridge St., Brooklyn, N. Y.
New Monarch Machine & Stamping Co., Des Moines, Iowa.
Parish Pressed Steel Co., Reading, Pa.
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.
Sessions, J. H., & Son, Bristol, Conn.
Special Hardware Co., Medford, N. Y.
Toledo (Ohio) Stamping & Mfg. Co.
Torrington (Conn.) Company
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Truscon Steel Co., Pressed Steel Div., Cleveland.
Wagner Specialty Co., Burlington, Wis.
Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.
Worcester (Mass.) Stamped Metal Co.

STAMPS—Steel Alphabets and Figures
Cunningham, M. E., Co., Pittsburgh.
Noble & Westbrook Mfg. Co., The, East Hartfrod, Ct.

STAPLES—Wire
Wickwire Brothers, Cortland, N. Y.

STEEL—Acid Resisting
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.

STEEL—Alloy
Alan Wood Steel Co., Conshohocken, Pa.
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—Alloy, Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

Products Index

STEEL—Bright Finished
Bliss & Laughlin, Inc., Harvey, Ill.
Union Drawn Steel Co., Massillon, Ohio.

STEEL—Carbon
American Steel Export Co., Inc., 347 Madison Ave., N. Y. C.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Harrisburg (Pa.) Steel Corp.
Ingersoll Steel & Disc Co., Chicago.
Latrobe (Pa.) Electric Steel Co.

STEEL—Carbon Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Manganese
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Chrome Nickel Silver
Ingersoll Steel & Disc Co., Chicago.

STEEL—Chrome Vanadium
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.

STEEL—Cobalt
Darwin & Milner, Inc., Cleveland.

STEEL—Cold Drawn
Bliss & Laughlin, Inc., Harvey, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.
Latrobe (Pa.) Electric Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Ryerson, Joseph T., & Son, Inc., Chicago.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips
Acme Steel Co., Chicago.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Athenia Steel Co., Clifton, N. J.
Bethlehem (Pa.) Steel Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn.; Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Thomas Steel Co., The, Warren, Ohio.
Weirton (W. Va.) Steel Co.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Cold Rolled Strips, Electro Copper Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro-Galvanized
Acme Steel Co., Chicago, Ill.
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Electro Tin Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Cold Rolled Strips, Stainless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.

STEEL—Corrosion Resisting
Midvale Co., The, Nicetown, Phila., Pa.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Crucible
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Jessop Steel Co., Washington, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Cutlery
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.

STEEL—Die
Disston, Henry, & Sons, Inc., Philadelphia.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Drill
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.

STEEL—Electric
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

STEEL—High Speed
Bethlehem (Pa.) Steel Company.
Cleveland (Ohio) Twist Drill Co., The.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Milne, A., & Co., 745 Washington St., N. Y. C.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Hot Rolled Strips
Acme Steel Co., Chicago.
Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Great Lakes Steel Corp., Detroit.
Inland Steel Co., Chicago.
Laclede Steel Co., St. Louis, Mo.
Latrobe (Pa.) Electric Steel Co.
Republic Steel Corp., Cleveland, Ohio.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Stanley Works, The, New Britain, Conn., Bridgeport, Conn.
Steel & Tubes, Inc., Cleveland.
Superior Steel Corp., Grant Bldg., Ptgh.
Weirton (W. Va.) Steel Co.

STEEL—Hot Rolled Strips, Electro Zinc Coated
Thomas Steel Co., The, Warren, Ohio.

STEEL—Hot Rolled Strips, Galvanized
Acme Steel Co., Chicago.

STEEL—Magnet
Latrobe (Pa.) Electric Steel Co.

STEEL—Open Hearth
Pittsburgh (Pa.) Steel Co.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Rustless
Acme Steel Co., Chicago.
Griffin Mfg. Co., Erie, Pa.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Rustless Iron & Steel Corp., Baltimore, Md.

STEEL—Screw
Bliss & Laughlin, Inc., Harvey, Ill.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Union Drawn Steel Co., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Special Analysis
Harrisburg (Pa.) Steel Corp.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL—Spring
Athenia Steel Co., Clifton, N. J.
Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.
Barnes, Wallace, Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Gibson, Wm. D., Co., Div. of Associated Spring Corp., Chicago.
Great Lakes Steel Corp., Detroit.
Republic Steel Corp., Cleveland, Ohio.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

STEEL-Stainless
Acme Steel Co., Chicago.
American Rolling Mill Co., Middletown, O.
Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Disston, Henry, & Sons, Inc., Philadelphia.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Republic Steel Corp., Cleveland, Ohio.
Rustless Iron & Steel Corp., Baltimore, Md.
Ryerson, Jos. T., & Sons, Inc., Chicago.
Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
Superior Steel Corp., Grant Bldg., Pittsburgh.
Union Drawn Steel Co., Massillon, Ohio.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Stainless Clad
Ingersoll Steel & Disc Co., Chicago.

STEEL—Tool
Bethlehem (Pa.) Steel Company.
Bissett Steel Co., The, Cleveland.
Darwin & Milner, Inc., Cleveland.
Disston, Henry, & Sons, Inc., Philadelphia.
Ingersoll Steel & Disc Co., Chicago.
Jessop Steel Co., Washington, Pa.
Jessop, Wm., & Sons, Inc., 121 Varick St., N. Y. C.
Latrobe (Pa.) Electric Steel Co.
Ludlum Steel Co., Watervliet, N. Y.
Midvale Co., The, Nicetown, Phila., Pa.
Milne, A., & Co., 745 Washington St., N. Y. C.
Ryerson, Jos., T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.
Windau Steel Co., Cleveland.

STEEL—Tool, Special Shapes
Forging & Casting Corp., The, Ferndale, Mich.
Latrobe (Pa.) Electric Steel Co.

STEEL—Vanadium
Latrobe (Pa.) Electric Steel Co.

STEEL PLANTS AND ROLLING MILLS
Brassert, H. A., & Co., Chicago, Ill.

STEEL ROLLS
United Engineering & Fdry. Co., Ptgh.

STOKERS
Babcock & Wilcox, The, 85 Liberty St., New York City.
Whiting Corp., Harvey, Ill.

Products Index

STOPS—Crane Limit
Electric Controller & Mfg. Co., The, Cleveland.

STRAIGHTENING MACHINES—Bar & Tube
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Medart Co., The, St. Louis, Mo.

STRUCTURAL IRON AND STEEL WORK
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Co.
Morgan Engineering Co., The, Alliance, O.

STRUCTURAL STEEL—See Angles, Beams, Channels and Tees

STUDS
Erie (Pa.) Bolt & Nut Co.

SUB PRESSES
U. S. Tool Co., Inc., Ampere, N. J.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWAGING MACHINES
Standard Machinery Co., Providence, R. I.
Torrington (Conn.) Company.

SWITCHES—Electric
Westinghouse Elec. & Mfg. Co., East Ptgh.

TANK LININGS
Cellcote Co., The Cleveland.
Nukem Prods. Corp., 68 Niagara St., Buffalo, N. Y.

TANK LININGS—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Alkali Cleaning
Detroit Rex Products Co., Detroit, Mich.

TANKS—Compressed Air, Gas, Oil and Water
Scaife, Wm. B., & Sons Co., Ptgh.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

TANKS—Iron and Steel
Munroe R., & Sons Mfg. Corp., Pittsburgh.
Scaife, Wm. B., & Sons, Co., Ptgh.

TANKS—Lead Lined
Dietzel Lead Burning Co., Pittsburgh.

TANKS—Pickling
Atlas Mineral Prods. Co. of Pa., The, Mertztown, Pa.
Blaw-Knox Co., Pittsburgh.
Cleveland (Ohio) Quarries Co., The.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Haveg Corporation, Newark, Delaware.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Nukem Products Corp., 68 Niagara St., Buffalo, N. Y.

TANKS—Rubber Lined
Blaw-Knox Co., Pittsburgh.
Goodrich, B. F., Co., The, Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

TANKS—Welded
Blaw-Knox Co., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Scaife, Wm. B., & Sons Co., Pittsburgh.

TAPPING MACHINES
Baker Bros. Inc., Toledo, Ohio.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.
National Automatic Tool Co., Richmond, Ind.

TAPS—Collapsing
Landis Mach. Co., Inc., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

TAPS AND DIES
Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Inc., Waynesboro, Pa.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TEES—See Angles, Beams, Channels and Tees

TELEPHONES—Interior
Screw Machine Products Corp., Prov., R. I.

TERNE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TESTING MACHINES—Ductility
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Hardness
Olsen, Tinius Testing Machine Co., Philadelphia.
Shore Instrument & Mfg. Co., The, Jamaica, L. I., N. Y.

TESTING MACHINES—Impact
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Materials
Baldwin-Southwark Corp., Southwark Div., Phila.
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Spring
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Tensile
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Torsion
Olsen, Tinius Testing Machine Co., Philadelphia.

TESTING MACHINES—Universal
Olsen, Tinius Testing Machine Co., Philadelphia.

THERMOMETERS
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS—Recording
Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia.

THERMOSTATIC—Bimetal
Chace, W. M., Co., 1605 Beard Ave., Detroit.

THREAD CUTTING TOOLS—See Die Taps

THREAD ROLLING MACHINES
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

THREADING MACHINES
Eastern Mcsh. Screw Corp., New Haven, Conn.
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Automatic
Landis Mch. Co., Inc., Waynesboro, Pa.

THREADING MACHINES—Bolt
Murchey Machine & Tool Co., Detroit.

TIE PLATES
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Weirton (W. Va.) Steel Co.

TIES—BALE
Acme Steel Co., Chicago, Ill.

TIN PLATE
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Granite City (Ill.) Steel Co.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Weirton (W. Va.) Steel Co.
Youngstown (Ohio) Sheet & Tube Co., The.

TIN PLATE MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.

TINNING EQUIPMENT—Sheets
Wean Engineering Co., Inc., The, Warren, Ohio.

TOOL BITS
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago.
Williams, J. H., & Co., Buffalo, N. Y.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TOOLS—Metal Cutting
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Pratt & Whitney Div. Niles-Bement-Pond Co., Hartford, Conn.

TOOLS—Precision
Starrett, L. S., Co., Athol, Mass.

TOOLS—Safety, Steel Stamp
Cunningham, M. E., Co., Pittsburgh.

TOOLS—Tungsten Carbide
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.
Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit.

TORCHES—Brazing, Cutting and Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

TRACTORS AND TRAILERS—See Trucks, Tractors and Trailers—Industrial

TRAILERS—Industrial—See Trucks, Tractors and Trailers—Industrial

TRAMRAILS—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., Wickliffe, Ohio.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

TRAMWAYS—Wire Rope
Leschen, A., & Sons Rope Co., St. Louis, Mo.

TRANSCRIBING MACHINES
Dictaphone Sales Corp., 420 Lexington Ave., New York City.

TRANSMISSIONS—Hydraulic
American Engineering Co., Philadelphia.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

TRANSMISSIONS—Variable Speed
Link-Belt Co., Chicago.
Reeves Pulley Co., Columbus, Indiana.

TRAPS—Steam
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

SPRINGS For all mechanical purposes up to and including 9/16 gage round or square wire. Also wire forms and springs of flat spring steel. We specialize in lighter wire gages.

U. S. STEEL WIRE SPRING COMPANY
East 53rd St. & Hamilton Ave., Cleveland, Ohio

THE WORLD'S STANDARD PICKLING INHIBITOR
CHEMICALS ACP PROCESSES
RODINE
MAKES PICKLING EFFICIENT

AMERICAN CHEMICAL PAINT CO.
AMBLER PENNSYLVANIA
Detroit, 6339 Palmer Avenue, E. • Canadian Branch, Walkerville, Ontario

FRANK SAMUEL AND COMPANY, INC.
Snowden Samuel, President S. A. Cochran, Vice-Pres.
Harrison Bldg. Philadelphia, Pa.
80% FERRO-MANGANESE ELECTROLYTIC
ENGLISH LOW PHOS. PIG IRON FRENCH FOUNDRY
MUCK BARS
LOW PHOS. & STAYBOLT AMERICAN SWEDO IRON CO.'S
MANGANESE ORE
OPEN HEARTH USE BLAST FURNACE USE
IRON ORES
AFRICAN LUMP CHROME ORES SAMCO GROUND
Branch Offices:
24 Arlington Rd., Boston, Mass 40 Exchange Place, New York, N. Y.

Established 1894
(at Indian Orchard, Mass.)
DEXTER P. LILLIE COMPANY
Manufacturers of
WIPING AND PACKING WASTE
P. O. Box 278 NEW BEDFORD, MASS.

MITCO
OPEN STEEL FLOORING
Pressure Formed : 90% Open Area : Easy to Install
HENDRICK MANUFACTURING COMPANY
37 Dundaff Street, Carbondale, Pa.

WIRE SHAPES
of Every Kind
HINDLEY MFG. CO., Valley Falls, R.I., U.S.A.

Products Index

TREADS—Safety
American Pressed Steel Co., Phila., Pa.
Blaw-Knox Co., Pittsburgh.
Central Iron & Steel Co., Harrisburg, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Norton Co., Worcester, Mass.

TROLLEYS
Curtis Pneumatic Machinery Co., 1948 Kienlen Ave., St. Louis, Mo.
Hanna Engineering Works, 1761 Elston Ave., Chicago.

TRUCKS—Dump (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS—Elevating (Power)
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland.
Barrett-Cravens Co., Chicago.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Factory, Hand
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.

TRUCKS—Lift (Hand & Foot)
Barrett-Cravens Co., Chicago, Illinois.
Lewis-Shepard Co., 122 Walnut St., Watertown Station, Boston.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

TRUCKS—Scoop (Industrial)
Towmotor, Inc., Cleveland.

TRUCKS, TRACTORS AND TRAILERS—Industrial
Atlas Car & Mfg. Co., The, Cleveland.
Baker-Raulang Co., The, 2175 W. 25 St., Cleveland.
Elwell-Parker Electric Co., The, Cleveland.
Towmotor, Inc., Cleveland.
Yale & Towne Mfg. Co., The, Phila., Div., Phila., Pa.

TUBE MILL MACHINERY
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
United Engineering & Fdry. Co., Pitgh.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

TUBES—Boiler
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Pittsburgh (Pa.) Steel Co.
Steel & Tubes, Inc., Cleveland.

TUBES—Copper Alloy
American Brass Co., The, Waterbury, Conn.

TUBES—High Carbon
Ohio Seamless Tube Co., Shelby, Ohio.
Steel & Tubes, Inc., Cleveland.

TUBES—Nickel Silver
American Brass Co., The, Waterbury, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBES—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ryerson, Jos., T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.

TUBING—Aluminum Seamless
Aluminum Co. of America, Pittsburgh.

TUBING—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia.

TUBING—Magnesium Alloys
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

TUBING—Nichrome
Steel & Tubes, Inc., Cleveland..

TUBING—Open Seam
Steel & Tubes, Inc., Cleveland.

TUBING—Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

TUBING—Rubber
Goodrich, B. F., Co., The, Akron, Ohio.

TUBING—Seamless Steel
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Son, Inc., Chicago.
Steel & Tubes, Inc., Cleveland.
Timken Roller Bearing Co., The, Canton, O.
Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBING—Square and Rectanguar
Steel & Tubes, Inc., Cleveland.

TUBING—Stainless Steel
Cleveland (Ohio) Tool & Supply Co., The.
Steel & Tubes, Inc., Cleveland.

TUBING—Tinned-Brass or Copper
Bundy Tubing Co., Detroit, Mich.

TUBING—Tinned-Steel
Bundy Tubing Co., Detroit, Mich.

TUBING—Tool Steel
Bissett Steel Co., The, Cleveland.

TUBING—Welded Steel
Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., Shelby, Ohio.
Steel & Tubes, Inc., Cleveland.
Youngstown (Ohio) Sheet & Tube Co., The.

TUBULAR PRODUCTS
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes, Inc., Cleveland.

TUMBLING BARRELS—See Barrels—Tumbling

TUNGSTEN—Metals & Alloys
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

TUNGSTEN CARBIDE
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit.

TURBINE-GENERATORS—Steam
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

TURBO-COMPRESSORS
Spencer Turbine Co., Hartford, Conn.

TURNTABLES
American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

TURNTABLES—Industrial
Canton Fdry. & Mch. Co., Cleveland.

TWIST DRILLS
Cleveland (Ohio) Twist Drill Co., The.
Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

TYPE—Steel
Noble & Westbrook Mfg. Co., The, East Hartford, Ct.

UNIONS
Crane Co., Chicago.

UNIT HEATERS—Electric
American Foundry Equipment Co., The, 401 Byrkit St., Mishawaka, Ind.

VALVES—Acid Resisting
Dietzel Lead Burning Co., Pittsburgh
Duriron Co., Inc., The, 438 N. Findlay St., Dayton, Ohio.
National Lead Co., 111 Bdway., N. Y. C.

VALVES—Air Blast for Presses
Littell, F. J., Mch. Co., Chicago.

VALVES—Air & Hydraulic Control
Brown Instrument Co., The, Philadelphia, Pa.
Galland-Henning Mfg. Co., Milwaukee.
Hanna Engineering Works, 1761 Elston Ave., Chicago.
Hannifin Mfg. Co., Chicago.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
Tomkins-Johnson Co., The, Jackson, Mich.
Westinghouse Air Brake Co., Industrial Div., Pittsburgh.

VALVES—Gas, Water and Steam
Brown Instrument Co., The, Philadelphia, Pa.
Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
North American Mfg. Co., The, Cleveland.
Wood, R. D., & Co., Philadelphia.

VALVES—Hydraulic
Baldwin-Southwark Corp., Southwark Div., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Crane Co., Chicago.
Galland-Henning Mfg. Co., Milwaukee.
Wood, R. D., & Co., Philadelphia.

VALVES—(Pressure Seated) Pneumatic
Cleveland (Ohio) Pneumatic Tool Co., The.

VALVES—Proportioning
Brown Instrument Co., The, Philadelphia, Pa.
North American Mfg. Co., The, Cleveland.

VALVES—Pump, Rubber
Garlock Packing Co., The, Palmyra, N. Y.

VANADIUM
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

VISES
Cincinnati (Ohio) Milling Mch. Co., The.
Jarecki Mfg. Co., Erie, Pa.
Knu-Vise Products Co., Detroit, Mich.

WASHERS—Iron or Steel
Sessions, J. H., & Son, Bristol, Conn.

WASHERS—Leather
Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

WASHERS—Lock
American Nut & Bolt Fastener Co., Pittsburgh.
Reall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
Houde Engineering Corp., Buffalo, N. Y.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

WASHERS—Spring
American Nut & Bolt Fastener Co., Pittsburgh.
Reall Tool Co., East Alton, Ill.
Butcher & Hart Mfg. Co., Toledo, Ohio.
Eaton Mfg. Co., Massillon, Ohio.
Hobbs Mfg. Co., Worcester, Mass.
National Lock Washer Co., The, Newark, N. J., and Milwaukee, Wis.
Philadelphia Steel & Wire Corp., Germantown, Philadelphia, Pa.
Positive Lock Washer Co., The, Newark, N. J.
Spring Washer Industry, 616 Wrigley Bldg., Chicago, Ill.
Washburn Co., The, Worcester, Mass.

Products Index

WASHING MACHINES—For Metal Parts
Ransohoff, N., Inc., Cincinnati.

WASTE—Wiping
Lillie, Dexter P., Co., New Bedford, Mass.

WATER SOFTENERS AND PURIFIERS
Scaife, Wm. B., & Sons Co., Ptgh.

WELDING—Copper Hydrogen Electric
Bundy Tubing Co., Detroit, Mich.

WELDING—Electric
Federal Machine & Welder Co., Warren, Ohio.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.

WELDING CONTACTS—Resistance
Electroloy Co., Inc., 50 Church St., New York City.

WELDING AND CUTTING MACHINES AND EQUIPMENT—Oxy-Acetylene
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit.

WELDING FIXTURES
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Una Welding, Inc., Cleveland, Ohio.

WELDING MACHINES—Butt
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Electric Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Lincoln Electric Co., The, Cleveland.
Una Welding, Inc., Cleveland, Ohio.
Westinghouse Elec. & Mfg. Co., East Ptgh.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WELDING MACHINES—Electric Arc, Second-Hand. (See Clearing House Section)

WELDING MACHINES—Flash
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Press
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.

WELDING MACHINES—Seam
Federal Machine & Welder Co., Warren, Ohio.

WELDING MACHINES—Spot
Federal Machine & Welder Co., Warren, Ohio.
Swift Electric Welder Co., Detroit.
Thomson-Gibb Elec. Welding Co., Lynn, Mass.

WELDING MACHINES—Universal Spot & Arc
Electric Arc Cutting & Welding Co., The, Newark, N. J.

WHEELS—Rolled Steel
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Standard Steel Wks. Co., Burnham, Pa.

WIRE—Aluminum
Aluminum Co. of America, Pittsburgh.

WIRE—Barb
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.

WIRE—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Seymour (Conn.) Mfg. Co.

WIRE—Electric Heat Resisting
Globar Div., The Carborundum Co., Niagara Falls, N. Y.

WIRE—Flat, Round, Square or Special Shapes
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Insulated
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Mattress
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE—Netting
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Cortland, N. Y.

WIRE—Piano and Music
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE—Rustless
Rustless Iron & Steel Corp., Baltimore, Md.

WIRE—Special Drawn Shapes
Rathbone, A. B. & J., Palmer, Mass.

WIRE—Spring
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Barnes, Wallace Co., The, Div. of Associated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Jones & Laughlin Steel Corp., Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

WIRE—Spring (Music)
Webb Wire Works, New Brunswick, N. J.

WIRE—Stainless Steel
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Rustless Iron & Steel Corp., Baltimore, Md.
Webb Wire Works, New Brunswick, N. J.

WIRE—Steel
Bethlehem (Pa.) Steel Co.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Wickwire Brothers, Cortland, N. Y.

WIRE—Welding
Air Reduction Sales Co., 60 East 42nd St., N. Y. C.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Lincoln Electric Co., The, Cleveland.
Maurath, Inc., 7400 Union Ave., Cleveland.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Una Welding, Inc., Cleveland, Ohio.
Wickwire Brothers, Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WIRE CLOTH
Buffalo (N. Y.) Wire Wks. Co., Inc.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE DRAWING MACHINERY—See Wire Mill Mchry. & Equip.

WIRE FORMING MACHINERY
Baird Mch. Co., The, Bridgeport, Conn.
Manville, E. J., Mch. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.
U. S. Tool Co., Inc., Ampere, N. J.

WIRE MILL MACHINERY AND EQUIPMENT
Morgan Construction Co., Worcester, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington (Conn.) Mfg. Co., The.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

WIRE NAIL MACHINERY
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE PRODUCTS
American Spring & Mfg. Corp., Holly, Mich.
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Buffalo (N. Y.) Wire Wks. Co., Inc.
Eastern Tool & Mfg. Co., Bloomfield, N. J.
Hindley Mfg. Co., Valley Falls, R. I.
Pittsburgh (Pa.) Steel Co.
U. S. Steel Wire Spring Co., Cleveland, O.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE
American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Roebling's, John A., Sons Co., Trenton, N. J.
Wickwire Spencer Steel Co., 41 East 42nd St., N. Y. C.

WIRE ROPE FITTINGS
Roebling's, John A., Sons Co., Trenton, N. J.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Shuster, F. B., Co., The, New Haven, Ct.

WRENCHES
Armstrong Bros. Tool Co., Chicago.
Billings & Spencer Co., Hartford, Conn.
Williams, J. H., & Co., Buffalo, N. Y.

WRENCHES—Pipe
Greenfield (Mass.) Tap & Die Corp.

WRENCHES—Pneumatic
Ingersoll-Rand Co., 11 Broadway, N. Y. C.

ZINC—SLAB (Spelter)
New Jersey Zinc Co., The, 160 Front St., N. Y. C.

ZINC—Strip
Platt Bros. & Co., The, Waterbury, Conn.

ZIRCONIUM METAL & ALLOYS
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

WIRE

ROUND—FLAT—HALF ROUND STRAIGHTENED AND CUT SHAPE WIRE

High Carbon Spring
Oil Tempered M.B. and H.B.

Specialize in Tinned Oil Tempered

Low Carbon Basic and Bessemer

Welding Wire Rods and Coils

Sizes 1/2" to No. 40 WM Gauge (.007)—All Finishes

Wire for Practically All Purposes and Requirements also SCREEN WIRE CLOTH

Highest Quality and Service Guaranteed

Established 31 Years

IRON STEEL WIRE "SENECA" QUALITY TRADE MARK

The Seneca Wire & Mfg. Company
Fostoria, Ohio
Representatives and Warehouses in practically all principal cities

"Buffalo"
"A BETTER WIRE CLOTH"
WIRE

In hundreds of industrial applications the better wire cloth made by "Buffalo" is giving maximum service. Made of plain steel and galvanized after as well as a variety of other metals. Catalog 10-K on request.

BUFFALO WIRE WORKS COMPANY INC.
456 TERRACE (Established 1869 as Scheeler's Sons) BUFFALO, N. Y.

MUSIC WIRE

THE WEBB WIRE WORKS
NEW BRUNSWICK, N.J.

★

Regardless of what the forecasters may say about 1938 business prospects they will doubtless agree that aggressive sales programs will be the order of the year. In such programs the power of advertising can make itself felt.

For contacting manufacturers of metal products The Iron Age is The Main Line of the Metal Working Industry.

★

CONSIDER GOOD USED EQUIPMENT FIRST

IMMEDIATE AVAILABILITY AND DELIVERY ARE IMPORTANT FACTORS

AIR COMPRESSORS
136 cu. ft. 8"x 8" Chicago Pneumatic Class NSB
253 cu. ft. 10"x10" Chicago Pneumatic Class NSB
1300 cu. ft. 22"x13"x16" Ingersoll-Rand Class 10B2
1573 cu. ft. 22"x13"x14" Sullivan Class WN3
2678 cu. ft. 28"x17½"x21" Ingersoll-Rand Class PRE2

BENDING ROLLS
10' Ryerson, Belt Driven. ½" Capacity
10' McCabe, Arr. for M.D. ½" Capacity
10' Bertsch, Belt Driven. ¼" Capacity
20' Wickes, Arr. for M.D. ⅝" Capacity
24' Hilles & Jones, M.D. ⅞" Capacity
30' Hilles & Jones No. 8. Arranged for Motor Drive. Capacity 1" Plate

DRAW BENCH
50 ton Cooper Seamless Tube Cold Draw Bench 25' Draw

FORGING MACHINES
2½", 3", 3½", 5" Ajax Steel Frame
5" AJAX HEAVY DUTY NEW MODEL TWIN GEAR. TOP SUSPENDED HEADER SLIDE, MOTOR BRACKET
2", 5" National Steel Frame

HAMMERS—BOARD DROP—STEAM DROP—STEAM FORGING
Chambersburg, Niles-Bement-Pond, Erie and Billings & Spencer 1200 lb. to 12,000 lb.

HEATER
American Car & Fdry. Co. "Berwick" Electric Metal Heater Type D, Size 3-5. Capacity 1" Rivets

LEVELLERS
40" Hilles & Jones, Motor Driven. Capacity ¼"
50" National 17 Roll, 3⅝" diameter rolls
60" National 17 Roll, 4½" diameter rolls
60" Newbold 11 Roll. Arranged for Motor Drive. Capacity 3/16" Plate

PIPE MACHINE
12" Saunders Pipe Cutting & Threading Machine, Motor Driven. Capacity 8" to 12"

PLATE EDGE PLANERS
No. 4 Hilles & Jones Motor Driven. Distance between housings 28'. Diameter of Screw 6". Capacity 1¾" plate 20' long. Equipped with pneumatic hold downs
10' Niles, Belt Driven. Distance between housings 11'9". Capacity ¾" Plate

PRESS—HYDRAULIC WHEEL
600 ton Niles-Bement-Pond, 48" Between Parallel Bars. Distance of ram 17". Motor Driven

PRESSES—STRAIGHT SIDE
No. 96G Toledo, 24" Stroke, 148" Between Uprights
No. 78½ Bliss 10" Stroke, 36" Between Uprights
No. 151 Ferracute, 12" Str., 32" Between Uprights
No. 304 Bliss, 4" Stroke, 18" Between Uprights

PRESSES—TOGGLE DRAWING
No. 412 Bliss, 86" Between Uprights
No. 1018 Bliss, 60" Between Uprights
No. 408 Bliss, 60" Between Uprights
No. 13 Bliss, Double Geared, 300 ton Capacity

19 OVERHEAD ELECTRIC TRAVELING CRANES—ALL IN ONE PLANT
Various Makes, Capacities and Spans. Complete with 230 Volt D.C. Motors and Controls. Single and Double Hook. Single and Double Trolleys. Building to be dismantled and Cranes must be removed promptly.
Priced low for immediate disposition.
All are in first class operating condition.
NUMEROUS OTHER CRANES AVAILABLE IN VARIOUS CAPACITIES AND SPANS, BOTH A. C. and D. C.

GANTRY CRANES
35 ton McMyler Steam (Oil Fired) Traveling Crane 70' Boom, 15' Between Legs, 22' Portal
Link Belt 2 Yard Steel Traveling Crane 100' Span 40' Cantilever, 45' Lift, 150' Length Overall

PRESSES—HYDRAULIC
450 ton Birdsboro 4-Column Flanging Press, 8'x12' Between Columns, 10' Daylight
500 ton Mesta 4-Column Vertical, 48"x48" Between Columns, 9' Daylight
1200 ton Southwark 4-Column Forging Press, 36"x 48" Between Columns, 82" Daylight

PUNCH & SHEAR COMBINATION
No. 0 Buffalo Armor Plate Universal. Capacities: Punch 11/16x½" & ⅝x⅝"; Shear Plate, ⅜"; Flats, 4x½"; Rounds, 1¼"; Squares, 1⅛"; Angles, 3"x3"x⅜"
No. ½ Buffalo Armor Plate Universal. Capacities: Punch, 1"x½" & ⅞"x⅝"; Shear Plates, ½"; Flats, 6"x⅝"; Rounds, 1⅛"; Squares, 1⅛"; Angles, 4"x4"x½"

ROLLING MILLS
8 "x 4½" Blake & Johnson Single Stand 2 High
4 "x 5 " Torrington Single Stand Two High
8¼"x10 " Belgian Three Stand Two High
9 "x10 " Columbia Two Stand 2 and 3 High
9" x14 " Columbia Two Stand 2 and 3 High
10 "x12 " Single Stand Two High Finishing Mill
12 "x15 " Mackintosh Hemphill Single Stand 2 High
12 "x16 " Phila. Single Stand Two High
14 "x24 " Hill Clutch Two Stand Two High
15 "x38 " Waterbury Farrel Single Stand 3 High Rod Mill, Motor Driven. Capacity Round Bars 1⅝" down to ⅞"
20 "x30 " Birmingham Two Stand Two High
22" Lewis Three High Bar Mill. Complete with electric driven feed and tilting tables, runout tables, bull head electric driven thru Fawcus Gear electric driven pusher for cooling table
Train of Six 30" dia. Two High Hot Sheet Mills. Complete with Hot Mill Drive Motors, Regulators. Controls, Speed Reducers

ROLL—PLATE STRAIGHTENING
Hills & Jones, Arranged for Motor Drive. Six Rolls 13¾" dia. 10'6" Between Housings. Capacity 1" plate

STRAIGHTENERS
No. 0 MEDART Straightening, Polishing & Sizing Machine, Multiple V Belt Drive. Timken Roller Bearings. Capacity Bars ½" to 1½" dia. incl. any length. Installed new July, 1937
No. 1 Sutton-Abramson Round Straightening Machine. Capacity Bars ⅝" to 1½" dia. Tubes ⅜" to 2" O.D.
No. 2 Sutton, Timken equipped thruout, with enclosed helical gear drive, forged steel rolls. Capacity ¾" to 4" inclusive

TESTING MACHINES
30,000, 50,000, 100,000 and 200,000 lb. Olsen & Riehle Bros. Universal Belt or Motor Drive

WIRE DRAWING MACHINES
Aetna, Belted Motor Drive. Capacity 1¾" diameter
Aetna No. 102. Double Bearing, Belted Motor Drive. Capacity 1⅛"

Pittsburgh Office 710 Park Bldg. • Manufacturing

RITTERBUSH & COMPANY, INC.
30 CHURCH ST., NEW YORK, N. Y.
Telephone Cortlandt 7-3437-3438

Equipment • Pittsburgh Phone Atlantic 1208

Confidential Certified Appraisals — *Consulting Engineering Service*

Liquidations—Bona Fide Auction Sales Arranged—Entire or Surplus Mfg. Equipment Inventories Purchased

HIGH GRADE MACHINE TOOLS

LATHES
20"x10' American Grd. Hd., S.P.D.
36"x14' Boye & Emmes. Quick change Cone Drive, New.
24"x10' Headey Geared Hd., S.P.D.
24"x10' Bradford Geared Hd., Arr. M.D.
3—36"x30' Lodge & Shipley Selective Geared Head, S.P.D. Two carriages. Like New.
30"x18' Lodge & Shipley Lathe, 3 S.C.D., DBG.
20"x10' American Ged. Hd., S.P.D.

GRINDERS
16"x72" Landis Plain, Self Cont.
16"x48" and 72" Landis Crankshaft.
Nos. 50, 55, 60, 65 and 70 Heralds.

GEAR CUTTERS
No. 6—60" Brown & Sharpe Gear Cutter.
No. 615 Fellows. 24-H G. & E. Hobber.
18-H Gould & Eberhardt Hobber.
6", 11", 18" Gleason Gear Generators.

BOLT AND PIPE THREADERS
2" Acme Class A Bolt Cutter.
6" Landis Pipe Machine, cone drive.
2" Landis Pipe Machine, cone drive.
1" double spindle Landis Bolt Cutter.
18" Landis Pipe Threader.

BORING MILLS
44" Niles, two heads.
24", 36" & 42" Bullard "New Era" A.C. Motor dr.
60" Niles Boring Mill, 2 heads.

MILLING MACHINES
No. 2 Rockford Universal, complete.
No. 4 Cincinnati Pl. Hl-Power, S.P.D.
No. 5A Brown & Sharpe Univ., S.P.D.
No. 5B Becker Vertical Miller.
No. 4 Cincinnati Univ., S.P.D.
No. 2 Cincinnati High Power Plain, S.P.D.
No. 2 LeBlond H.D. Univ. complete.
No. 3 Kempsmith Universal.

PLANERS
42"x42"x10' Cleveland Open A.C., M.D.
26"x26"x 8' Cleveland Openside.
36"x36"x10' Gray, 2 Hds.

RADIAL AND UPRIGHT DRILLS
2½, 3, 3½, 6' Cinci-Bick., S.P.D.
5'—6' arm American Triple Purpose, S.P.D.
6' arm American Triple Purpose, S.P.D.
4' Heavy Duty Fosdick, S.P.D.

SHAPERS
16", 20", 24" G.&E., mtr. dr. thru g.b.

Write for Complete Catalog. We Buy, Sell & Exchange

CINCINNATI MACHINERY & SUPPLY CO.
28 West Second St. Cincinnati, Ohio

AUTOMATICS

100% Rebuilt for Immediate Delivery

1—3¾" Four Spindle Model B Acme
1—1¼" Four Spindle Cone
1—No. 652 New Britain
1—No. 654 New Britain
1—No. 452 New Britain
1—No. 454 New Britain
1—No. 33 New Britain
1—4½" Model L, S. S. Gridley
1—9/16" Model G Gridley
1—1½" Model GA, Gridley
2—4" Model H Gridley Chuckers
1—2¾" Model A Cleveland
1—⅞" Model A Cleveland
1—⅝" Model A Cleveland
1—⅝" Model B Cleveland
4—Four Spindle Cleveland Nut Machines
2—1¼"x18" Cleveland Shaft Machines
2—1½"x18" Cleveland Shaft Machines
Over sixty automatics in stock—Cones, Gridleys, New Britains and Clevelands

MISCELLANEOUS
1—No. 12 Brown & Sharpe Miller
1—Briggs Automatic Miller, table 6"x12"
1—36" Baush Vertical Mill, two heads
1—Beaman Smith Vertical Miller, table 54"x27"
1—45 HP Ridgeway Steam Engine, with 25 KW DC Thompson Ryan Dynamo
Collets and Pushers for ⅜", 1¼", 2", 2½", and 2⅝". Models A, B, C and M Clevelands
Collets and Pushers for 9/16", ⅞", 1", 1¼", 1⅜", 1⅝", 1¾", 2¼", 3¼", 4¼" and 5" Models G, F, C, J and L Gridleys
Collet Pads and Pusher Pads for 1¼", 1¾", 2¼", 2⅝", 3¼", 4¼", 5" and 5¼" Models G, F, C, J and L Gridleys
Collet Pads and Pusher Pads for 2", 2½", 2¾" Models A, B, C and M Clevelands
Collets and Pushers and Pads for 515, 52, 53, and 55 Acmes
100 Tons of new repair parts for Clevelands and Gridleys
200 Emery Wheels for 12" P&W Vertical Grinders. Also 30.000 left hand drills

TUPHOLME COMPANY
P. O. BOX 115, PITTSFIELD, MASS.

BORING MILLS
1—No. 1 and No. 2 Barrett Horizontal
1—6" Espen Lucas Horizontal
1—12' Niles Vertical, M.D.
1—10-16' Betts Vertical, M.D.
1—84" Bullard Vertical
1—72" N-B-Pond Vertical
1—62" N-B-Pond Vertical
1—53" N-B-Pond Vertical
1—60" Colburn Vertical
1—60" Cincinnati Vertical
1—48" Colburn Vertical
1—36" Bullard Rapid Productios

LATHES
1—109" x 50' N-B-Pond, M.D.
1— 65" x 32' Bement-Miles Heavy Duty
1— 36" x 26' Lodge & Shipley
1— 30" x 16' Houston-S-Gambel
1— 26" x 20' Sidney, Geared Head

PLANERS
1—84" x 84" x 18' N-B-Pond, M.D.
1—72" x 72" x 12' N-B-Pond, M.D.
1—48" x 48" x 18' Cincinnati, M.D.
1—42" x 42" x 22' Cincinnati, M.D.
1—36" x 36" x 14' Gray, M.D.

GEAR CUTTERS
1— 72" Cincinnati type G Cutter
1—100" Gould & Eberhardt Hobber

GRINDERS
1—40" x 20' Landis Heavy Duty Plain
1—No. 24 Gardner Disc
1—18" x 84" Landis Plain

MILLERS
1—No. 3 and No. 4 Cincinnati Plain
1—No. 5 Cincinnati Plain

SHAPERS
1— 6" Pratt & Whitney Vertical
1—24" Gould & Eberhardt, S.P.D.
1—24" American, M.D.
1—28" Columbia Heavy Duty

HAMMERS—ROLLS
1—5N Nazel Air Hammer
1—40' x 1" Southwark Bending Rolls, M.D.

SIMMONS MACHINE TOOL CORP.
ALBANY, N. Y. New York City, 149 Broadway
(Write for our latest stock list)

MONARCH

REBUILT TOOLS ARE SOLD ON APPROVAL

MONARCH MACHINERY COMPANY
325 No. 3rd St., Philadelphia, Pa.

60" x 60" x 14'

NILES-BEMENT-POND PLANER

3 heads—rapid traverse—box table—forced lubrication—reversing motor drive.

Like New

BUFFALO MACHINERY CO., INC.
839 Grant St. Buffalo, N. Y.

ENGINE LATHE

72" x 40' PUTNAM Motor Drive Heavy Duty

ROSENKRANZ, WEISBECKER & Co., Inc.
149 BROADWAY, N. Y. C.

THE CLEARING HOUSE

USED MACHINERY

That operates Like New

BORING MILLS—Horizontal and Vertical

N.B.P. No. 1½ portable, 3⅞" bar horiz.
BEAMAN & SMITH 5" bar horiz.
BULLARD 24" vert.
BULLARD 42" New Era Type Vert.
N.B.P. 42", 44", 51", 52" vert.
COLBURN 54", 2 swivel hds. vert.
POND 90", 2 hds. vert.
NILES 10' vert.

PLANERS

CLEVELAND 48"x48"x16'; 4 heads openside
AMERICAN 36"x36"x20'; 3 hds.
CINCINNATI 36"x36"x12'; 2 hds.
N.B.P. 48"x48"x16'; 4 hds.

LATHES

NILES BEMENT POND 46"x15', Q.C.G.
PITTSBURGH 36"x28', grd. hd.
PUTNAM 36"x28', 3 step cone, DBG.
PUTNAM 36"x28', grd. head—Nearly New
BRIDGEFORD 36"x60' comb. boring and turning
BRIDGEFORD 36"x60' boring
McCABE 27-49x16' Double Spindle
LODGE & SHIPLEY 24"x10' cone dr.
GREAVES & KLUSMAN 16"x8' motor-in-base
PRATT & WHITNEY 16"x8' grd. hd. toolroom

MILLING MACHINES

BROWN & SHARPE No. 1 Vert.
CINCINNATI 24", 48" Automatic
INGERSOLL No. 3 Combined heavy duty Vert.
INGERSOLL 24"x24"x12', planer type
INGERSOLL 24"x24"x12', slab
NEWTON No. 2 Ver. spdle. keyseat
BROWN & SHARPE No. 4 Universal cone dr.
CINCINNATI Nos. 2, 3, 4 Plain
LEES BRADNER No. 4 thread
PRATT & WHITNEY 4½x12, 6x48, 6x80 thread
BECKER C-1 and C Vertical
BROWN & SHARPE No. 1Y Plain; latest type
KEARNEY & TRECKER No. 1B Vert. P.R.T.

42" BULLARD New Era Type Vertical Turret Lathe—
side head, cutting lubricant system

DRILL PRESSES

NATCO No. 12, No. 13, No. 22 Multiple spdle.
NATCO C11 Drill—mechanical feeds.
NATCO C13H Drill—hydraulic feeds
PRATT & WHITNEY No. 12 rect. head

DRILLS—RADIAL

AMERICAN 3', 5' triple purpose
CINCINNATI BICKFORD 5' full Univ.
DRESES 3' and 5' Pl. SPD.
REED PRENTICE 4' Pl.

GEAR CUTTING EQUIPMENT

BROWN & SHARPE No. 4, 48" Gear Cutter
BARBER & COLMAN Nos. 3 and 12 Gear Hobbers
GOULD & EBERHARDT 18", 36" Hobbers
CLEVELAND 8 spdle. Spline Hobber
GLEASON 15" Spiral Bevel Gear Finisher
GLEASON 10" Spiral Bevel Gear
FELLOWS No. 8B Burnisher
FELLOWS Nos. 6, 61, 615
FELLOWS Nos. 7, 71
LEES BRADNER Lapper, cap. 1¼"x8"

GRINDERS

BRYANT No. 3 Internal
PERSONS ARTER 12" Rotary surf.
HEALD Nos. 50, 55, 60, 65 Intl.
HEALD No. 72 Hydr.; 72-A-3 Sizematic
LANDIS 10x24, 10x36, 10x72
DIAMOND 48" type H Surf.
NORTON type BBI 14x30x36" crankpin
DIAMOND 84" Face
PRATT & WHITNEY No. 14 surface

MISCELLANEOUS

FOSTER No. 1B, No. 3B Univ. Turret Lathe
BROWN & SHARPE No. 2F, No. 6F Screw Mach.
CLEVELAND ⅜"; 2-2½"; 2¼-2¾" Model "A"
TREADWELL 12" pipe mach.
LIBBY 18" model "A", 26"—7½" hole
LYND FARQUHAR 26" Shaper sgle. hd.
PRATT & WHITNEY No. 12 Profiler, grd.
GLEASON 12" Cutter Sharpener
REED PRENTICE No. 3 vert. die sinker, late type
ACME 2" all steel Upsetter
NAZEL No. 2B Hammer
TOLEDO No. 5½ D.C. Power Press
HENRY & WRIGHT 50 ton Die Press

ask for details
1000 other machines in stock

MOREY
MACHINERY CO., INC
410 BROOME ST. NEW YORK

PLANERS

24"x24"x24" Cincinnati crank
24"x24"x 6' Liberty openside
30"x30"x12' Cleveland openside
32"x32"x12' Niles
36"x36"x 8' Gray
36"x36"x12' Gray
36"x36"x16' Cleveland openside
48"x36"x10' Liberty openside

BORING MILLS

24" Bullard, turret & side head
30" Bullard, single turret
34" Colburn, single turret
36" Niles car wheel boring
42" Detrick & Harvey, MD, PRT
42" King, I plain, I turret head, PRT
60" Gisholt, MD, PRT

PRESSES

Nos. 19 & 21¼ grd. Bliss OBI
No. 5 Toledo OBI geared
No. 75 Toledo geared
Nos. 55½ & 56½ Toledo
Nos. 64, 65 & 66 Consolidated
No. 30¾ Bliss arch frame
600 ton Cleveland coining
No. 23 Consolidated horning
No. 25½ Consolidated horning
Nos. 1½B & 5A Bliss toggle draw
No. DDG54 Ferracute cam draw
No. 266 Consolidated cam draw
72", No. 3G Bliss double crank
Nos. PG4 & PG5 Ferracute

RADIAL DRILLS

2½' Morris
3' Cincinnati Bickford
4' Hammond
4' Mueller
6' Niles Bement Pond universal
3½', 4', 5', 6' & 8' Western

GRINDERS

No. 2 Cincinnati centerless
Nos. 70 & 72 Heald internal
No. 72A3 Heald Sizematic
No. 12 Bryant internal
12" Arter rotary surface
26", No. 16 Blanchard surface
6"x10"x36" Norton surface
30"x18"x72" Springfield surface
Norton from 6"x32" to 14"x72"
Landis from 6"x18" to 16"x53"
12"x60", No. 4 B. & S. universal
30", No. 7½ Gardner disc. MD
Nos. 220 & 221 Badger opposed disc
No. 3 Barber Colman hob grinder
Pratt & Whitney worm grinder.

2000 Tools in Stock. Send for List

MILES
MACHINERY COMPANY
SAGINAW, W. S.
MICHIGAN

HEAVY DUTY PLATE DRILL

80 Spindle Hill Drill No. 1-F equipped with 80 No. 3 M. T. heads and 25 No. 5 M. T. heads adjustable for center distance on the rail; 26' between housings; motor driven. Write for full specifications and photograph.

Many Other High Grade Machines

INDUSTRIAL MACHINERY COMPANY
2100-2300 Fletcher Ave. Indianapolis, Ind.
Drexel 3300.

52" Gisholt Vertical Boring Mill, rapid traverse.
20" x 8' Springfield GH Lathe, 12 speed ballbearing head, MD.
30" x 16' LeBlond Lathe, cone head, TA.
No. 2 Mitts & Merrill Keyseater.
2 x 24" J. & L. Steel Head Flat Turret Lathe, MD.
No. 13 B. & S. Universal Tool & Cutter Grinder, BD.
16" Gould & Eberhardt Shaper, cone drive.
24" Gould & Eberhardt Shaper, gear box AC drive.
No. 1 Kempsmith Universal Miller, full equipment.
4-spindle Allen Drill, power feed to each spindle, MD.

BUFFALO MACHINERY CO., INC.
839 Grant Street Buffalo, N. Y.

McCABE
USED DOUBLE SPINDLE LATHES

26/48" Swing—12 to 24' Beds

Regular good used condition — or Guaranteed Rebuilt.

Late Type — Geared Head Lathes.

24-40" Swing 14-18 ft. Beds
Good as New.

10' SET BENDING ROLLS

McCabe Machinery Co.
205 East 42 Street New York City

REBUILT—GUARANTEED

No. 4G LeBlond Plain Miller, G.H., S.P.D.
No. 3 LeBlond Plain Miller, cone drive
No. 3 B. & S. Plain Miller, cone drive
No. 3 B. & S. Universal Grinder, belt drive
No. 2 B. & S. Surface Grinder with Magnetic Chuck
16"x48" Landis Crank Shaft Grinder
12"x72" Landis Plain Grinder
21"x12' LeBlond Lathe, cone drive
27"x10' Greaves Klusman Lathe, cone drive
27"x10' American 8 speed Geared Hd., S.P.D.
3' American Radial Drill, Gear Box, S.P.D.
4½' Morris Radial Drill, Gear Box, S.P.D.
24" G. & E. Shaper, cone drive
30" Stockbridge Shaper, cone drive
15" P. & J. Shaper, Universal Table, cone drive
8' and 10' Robinson Press brake

Send for complete stock list

IROQUOIS MACHINERY CO.
856 Ohio Street Buffalo, N. Y.
Phone Washington 1513

3A WARNER & SWASEY

Arranged for chucking with chuck and tools, serial 250,600.

THE O'BRIEN MACHINERY CO.
113 N. THIRD ST., PHILA., PA.

SPECIAL OFFERINGS

5' American Triple Purpose Plain Radial Drill
No. 2-B Foster Universal Timken Bearing Turret Lathe
No. 1-B Foster Universal Turret Lathe
2" Landis Double Head Motor Drive Bolt Threader, like new
24" x 14' Chard Lathe.
26" x 12' Ryerson Geared Head Lathe, M. D.
No. 5 Bliss-Solid Back Punch Press, M. D.
No. 8 Buffalo Bar Cutter, 95% New
51" Niles Vertical Boring Mill.

THE E. L. ESSLEY MACHINERY CO.
829 W. Evergreen Ave., Chicago, Illinois

3—2¼" Single Spindle Gridley Automatics

1—#70 Heald Grinder, M.D.

D. E. DONY MACHINERY CO.
47 LAURELTON ROAD ROCHESTER, N. Y.

26" x 120" LANDIS GRINDER

Self Contained — Motor Drive

BENNETT-RAFKIN MACHINERY CORP.
30 CHURCH STREET, NEW YORK, N. Y.

Investigate HILL-CLARKE MACHINE TOOL OPPORTUNITIES

BORING MACHINES
5" N-B-P Floor Type
5" Newton Portable
4½" Hamilton Floor Type
3½" Rochester Floor Type
3" No. 2 Rochester
3" No. 3A Universal
2½" No. 1 Cleveland

BORING MILLS
24", 36" Bullard "New Era"
24" Bullard "Rap. Prod."
42" Bullard "New Era"
30", 52", 62" King
48", 54", 60" Colburn

DRILLS
1, 2, 3 spdl. Lel.-Gifford
4, 6 spdl. Lel.-Gifford
1, 2, 3 spdl. H. & W.
4, 6 spdl. Henry & Wright
32" Cinn. Bickford
No. 210 Barnes, 1 spdl.
No. 210 Barnes, 3 spdl.
No. 2 Colburn, 1, 2 spdl.
No. 2 Colburn, 3, 4 spdl.
No. 3—24" Defiance
Nos. 121, 314 Baker
No. 25—36" Foote-Burt
No. 2—Western Multiple
No. 12-C Fox Multiple
No. 14 Natco Multiple
No. 4 Baush Multiple

RADIALS
3' Carlton Sensitive
5' American Full Univ.
5' American Triple Purpose
6' American Triple Purpose

GEAR CUTTERS
Nos. 2, 3, 12 Barber-Colman
No. ½ Pfauter Hobber
No. 18-H G. & E.
No. 16-HS G. & E.
No. 3—26" B. & S.
No. 4—48" B. & S.
No. 6—60" B. & S.
No. 2—60" Goss Hobber
No. 6—72" B. & S.
11" Gleason Bevel
Nos. 6, 61, 62 Fellows
Nos. 65, 615, 625 Fellows
12"x72" G. & E. Rack Cutter
96" Newton, M.D.

GRINDERS
NORTON Motor Driven—nearly all sizes
26"x168" Landis Plain
26"x96" Landis Plain
No. 2 B. & S. Univ.
12"x66" Landis Univ.
No. 70 Heald Int.
No. 10 Blanchard
No. 16-A Blanchard
Landis Crankpin Grdr.
16" Arter Rotary Surf.
14"x36" P. & W. Surf.
Norton Open Side Surface

LATHES
14"x 6' Lodge & Shipley
14"x 8' American
16"x 6' American
16"x 8' Lodge & Shipley
18"x 6' American
18"x 6' Lodge & Shipley
20"x 8' Lodge & Shipley
20"x14' L. & S. Grd. Hd.
22"x12' Lodge & Shipley
24"x12' L. & S., Grd. Hd.
26"x14' LeBlond Crank
30"x11' American Grd. Hd.
30"x16' American
36"x30' Rahn-Larmon
54"x23' Johnson
66"x21' Putnam

MILLERS
No. OY Brown & Sharpe
No. 24 Hvy. Ohio
No. 2-B K. & T., pl., M.D.
No. 2-B, No. 3-B B.&S. pl.
No. 3-B Milwaukee, pl.
No. 2, No. 3 Cinn. pl.
No. 4-B B. & S. plain
No. 4 Cincinnati plain
No. 1½ B. & S. Univ.
No. 2 B. & S. Univ.
No. 2, No. 3 Cinn. Vert.
No. 3-B Milwaukee Vert.
No. 5-B, No. 6 Becker
18" & 24" Cinn. Duplex
No. 5 Cincinnati Hydro.
6"x14" P. & W. Thread
6"x48" P. & W. Thread
Hanson-Whitney Thread

PLANERS
24"x24"x 6' American
30"x30"x 6' Gray
30"x30"x 9' Cincinnati
30"x30"x14' Gray
36"x36"x 8', 12' Cincinnati
36"x36"x18' Cincinnati
42"x42"x30' Niles-Bement-Pond, Arr. Rev., M.D.
44"x36"x12' Gray
48"x48"x10' D. & H., O.S.
48"x48"x16' N-B-P
60"x48"x16' Gray
60"x48"x20' Hamilton
72"x60"x16' American

SHAPERS
16" Walcott
16" Stockbridge
24" Gould & Eberhardt

TURRET LATHES
No. 4 W. & S. Univ.
No. 1-A W. & S.
No. 2-A W. & S.
No. 3 Cinn.-Acme
No. 3-A W. & S. Tim. Brg.
No. 4-A W. & S. 7⅝" H. S.
No. 4-L Gisholt, 9¼" H. S.

CINCINNATI PLAIN HYDROMATIC MILLER

No. 5—48" CINCINNATI HYDROMATIC MILLER
ARRANGED MOTOR DRIVE, ONE WAY FEED CYCLE, SPINDLE REVERSE, AUTOMATIC SPINDLE STOP, AUTOMATIC LUBRICATION, VARIABLE FEED ATTACHMENT.

HILL-CLARKE MACHINERY CO.
647 WASHINGTON BLVD. CHICAGO, ILL.

TRUSTEES' SALE IN BANKRUPTCY

Est. Saltsburg Coal Mining Company
Bkpt. No. 20016

Mining Properties, Leases, Machinery and Equipment of
5 COAL MINES
In Armstrong, Westmoreland and Indiana Counties, Pa.
TO BE SOLD AT AUCTION
MONDAY, JANUARY 10, 1938, AT 11 A. M.

REAL ESTATE: A total in the six mines of approx. 3500 acres surface area; originally conveyed approx. 12,100 acres of coal. **[4 VALUABLE LEASES.]**
MACHINERY AND EQUIPMENT. HOISTS: 10 Brownie electric mine room hoists; 40 Lidgerwood motor driven hoisting engines. Meade & Morrison electric winch.
FANS: Connelsville, Robinson and American ventilating fans.
MINE CARS: 890 wood frame mine coal cars.
LOCOMOTIVES: 18 Jeffry and G. E., 6 to 10-ton mine locomotives.
MINING MACHINES: 28 Goodman and Jeffry low vein and arc wall mining machines. 5½ to 7 ft. cutting bars.
PUMPS: 17 Harris, Deming, Dravo, Scranton and Stein centrifugal and plunger pumps all directly connected to A. C. and D. C. motors.
DRILLS: Fort Wayne portable rock drills, electric hand drills, etc.
MACHINE SHOP EQUIPMENT: Heavy duty engine lathes, drill presses, 50-lb. power hammers, chain hoists, grinders, etc.
RAIL: 60,000 feet 25 to 80-lb. rail.
WIRE: Quantities of 4° copper trolley wire, electric wire, etc.
GENERATOR SETS: 9 G. E. 1 to 150 K.W. D.C. motor generator sets and panel switch boards.
MOTORS: AC and DC, 1 to 60 HP motors. Pittsburgh and Westinghouse, 1 to 25 KVA transformers, compensators, etc.
TIPPLES AND HEAD FRAMES: Wood frame tipples with scales, weigh pans, crushers, wire rope, button conveyors, conveyor picking tables, bucket aerial tram, etc.
SUPPLIES: Large quantity new replacement parts for locomotives, mining machines, mine cars, pumps, motors, etc.
MISCELLANEOUS EQUIPMENT: Large lot scrap iron, mine timbers and cable; small tools. Chevrolet 1937 1½-ton truck, etc.

Special Notice: *Deeds and Leases may be examined at any time upon application to the Trustee, his counsel or the Auctioneers.*

By Order of Ward M. French, Trustee

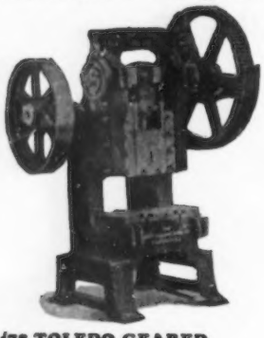
Benjamin Ludlow, Esq., Girard Trust Co. Bldg., Philadelphia, Attorney for Trustee

Descriptive Catalog Upon Application to

SAMUEL T. FREEMAN & CO., Auctioneers
1808-10 CHESTNUT STREET, PHILADELPHIA
80 Federal St., Boston 27 William St., New York

THE CLEARING HOUSE

GAPFRAME PRESS
BRAND NEW
SAVE $1,000.00
Immediate Shipment



#78 TOLEDO GEARED
Complete with motor
New Cost $3250.00
Our Price $2250.00
f. o. b. Philadelphia
Ram Pressure 105 tons
Weight 17,500 lbs.
Stroke 5"
Bed Area 20 x 37½"
Distance ram to bed, stroke down, adj. up 11¼"

J. N. MOYER
471 No. 5th St. Philadelphia, Pa.

FORGING MACHINE

1½" Acme All Steel, 8" stroke, for motor drive. Weight 18,000 lbs. Used very little. Fine condition. Attractive price.

PRESSES

95-E Toledo D.C., D.B.G. Tie-Rod, 10" stroke, 85" betw. housings, friction clutch. Spring knockout, for motor drive. In excellent condition.

59¼ Toledo S.C., D.B.G. Tie-Rod, bed 40x4", 8" stroke, Fctn. Clutch, B.D., Good.

77½ Bliss S.C., D.B.G., Tie-Rod, 8" stroke, with Marquette Cushions.

57 Toledo S.C., D.B.G., 16" stroke, bed 24"x24", Friction Clutch, for belt drive.

MARR-GALBREATH MACHINERY CO.
55 Water Street, PITTSBURGH, PA.

We Have Your "Must Have" Ready For IMMEDIATE DELIVERY
"Partial List"

SYNCH. MOTORS	350 H.P. Ridgway 900 RPM 175 H.P. G.E. 600 RPM
SLIP RING MOTORS	150 H.P. G.E. 720 RPM 125 H.P. G.E. 1200 RPM 100 H.P. G.E. 900 RPM 100 H.P. G.E. 1200 RPM 100 H.P. F.M. 600 RPM 75 H.P. West. 1200 RPM (4) 60 H.P. G.E. 900 RPM 50 H.P. G.E. 900 RPM 50 H.P. West. 1200 RPM
SQUIR. CAGE MOTORS	220 H.P. Cr. Wh. 720 RPM 150 H.P. G.E. 600 RPM 125 H.P. Al. Ch. 1750 RPM 100 H.P. G.E. 900 RPM 100 H.P. West. 720 RPM 75 H.P. G.E. 900 RPM 75 H.P. G.E. 720 RPM 75 H.P. Al. Ch. 600 RPM 75 H.P. G.E. 450 RPM 60 H.P. G.E. 1200 RPM 50 H.P. G.E. 1200 RPM 50 H.P. Ridgway 3600 RPM
A.C. GEN.	200 K.W. G.E. 720 RPM 150 K.W. Al. Ch. 900 RPM 150 K.W. G.E. 900 RPM 90 K.W. G.E. 900 RPM 75 K.W. G.E. 1200 RPM 45 K.W. G.E. 1200 RPM 30 K.W. West. 1200 RPM
MOTOR GEN. SETS	100 K.W. G.E. 230 V. 100 K.W. G.E. 115 V. 50 K.W. G.E. 230 V. 30 K.W. West. 230 V.
115 V. D.C. MOTORS	90 H.P. G.E. 900 RPM 50 H.P. G.E. 1750 RPM 40 H.P. G.E. 400/600 RPM
230 V. D.C. MOTORS	150 H.P. G.E. 1750 RPM 100 H.P. West. 625 RPM 75 H.P. Burke 1140 RPM 75 H.P. West. 850 RPM 75 H.P. E.D. 400 RPM 60 H.P. West. 1200 RPM 60 H.P. E.D. 500/1200 RPM 50 H.P. G.E. C0181082, 725/1800 RPM 30 H.P. G.E. 825/2000 RPM 15 H.P. G.E. 600/1800 RPM 15 H.P. G.E. 500/2000 RPM 10 H.P. G.E. 400/1600 RPM 10 H.P. G.E. 575/1725 RPM
550 V. D.C. MOTORS	66 H.P. G.E. 1700 RPM 50 H.P. G.E. 1200 RPM 10 H.P. G.E. 1075 RPM
ELEC. WELDERS	500 amp. West. Multiple Operator 100 amp. Hobart Portable
ELEC. HOISTS	5 Ton G.E. 230 V. 3 Ton Shepard 230 V. 2 Ton G.E. A.C. 1 Ton Euclid A.C.
PLATERS	5000 amp. Boissier Mtr. Driven

L. J. LAND—Est. 1910
140 GRAND STREET, NEW YORK, N. Y.
New York City's Largest Stock

No. 58 Toledo Press, 6" str., B.D.
No. 9 Buffalo Bar Shear, 3" Cap., M.D.
42" & 48" Aetna Std. Sheet Levelers, M.D.
48" Ryerson Friction Saw, M.D., 220/3/60.
5-ton Case Crane, 65'3" span, 220 V., D.C.
6x6x⅝" Dbl. Angle Shear, M.D.
60"x60"x20' Pond Planer, B.D.
28"x64" Farrel Roll Grinder, M.D.
10'-16' Betts Boring Mill, M.D.
42" King & 62" Betts Bor. Mills.

WEST PENN MACHINERY CO.
1210 House Bldg., Pittsburgh, Pa.

No. 95E TOLEDO DOUBLE CRANK PRESS, Ram 74" x 9", tie rod
No. 59¼ TOLEDO S.S. TIE ROD PRESS
EMBOSSING PRESSES, 400 and 600 Ton
DOUBLE ANGLE SHEARS: Kling 6"x6" x1" 8"x8"x1"
BULLDOZERS: Nos. 1 to 26, No. 24 Vert.
UPSETTING and FORGING MACHINES: 1" to 5"
5000 LB. ERIE DOUBLE FRAME FORGING HAMMER
No. 5B NAZEL HAMMER, Belt Drive, Cap. 6" sq.
BUFFALO BAR SHEAR: No. 8 for Rounds, Flats and Structural shapes
400 TON WHEEL PRESS
PRESSES: Solid Back, Incl. and Trimming
STRUCTURAL MACHINERS: Punches, etc.
TENSILE TESTERS: 20,000, 40,000 and 200,000 lb.
THREADING MACHINES: ⅝" to 4" Single and Double Spindle, lead screws
D & K BENDING BRAKES: 10' x 5/16"; 10' x 16 ga. pan
NIAGARA SHEAR: 10' x 18 ga.
YODER SLITTER: 36" x 16 ga.
BOLT, NUT and RIVET MACHINERY: Headers, Trimmers, Thread Rollers, Slotters, Stud Threaders, Tappers, Burring Machines, etc.

DONAHUE STEEL PRODUCTS CO.
74th St. & Ashland Ave. Chicago, Ill.

INGERSOLL-RAND 2 STAGE AIR COMPRESSOR —TYPE XRB—7x10 and 11x10—Complete with Motor
Nos. 4 & 6 WARNER SWASEY HAND SCREW MACHINE
30"x12' AMERICAN—16"x8' LODGE & SHIPLEY ENGINE LATHES, Cone Drive with Taper attachment
16", 20", 24", 28" GOULD & EBERHARDT SHAPERS, SINGLE PULLEY DRIVE AND CONE DRIVE
Nos. 70 & 75 HEALD INTERNAL GRINDERS
AVEY BALL BEARING DRILLS, 1, 2, 3 spindles
No. 2, 3 CINCINNATI MILLERS—PLAIN & UNIVERSAL CONE DRIVE
No. 2 DIAMOND SURFACE GRINDER
PARTIAL LIST — SEND US YOUR INQUIRIES.

INDIANAPOLIS MACHINERY & SUPPLY CO., INC.
1959-69 South Meridian Street, Indianapolis, Indiana

For Sale
Strip Steel Rolling Mill
Automatic Rewind
All Roller Bearing
R. & S. MACHINERY CO.
19 Howard Street, New York City

TWO FANS, No. 140, manufactured by Clarage Foundry Mfg. Co., Kalamazoo, Mich. Floor size 36" x 108"; elevation 84"; shaft size 3 3/16". Both arranged for belt drive on one side, but without motors. Fans are 84" in diameter with 8 blades, 20" wide.

ALSO ONE FORCED DRAFT FAN, manufactured by Garden City Fan Company of Chicago, Ill. Floor size of this fan is 42" x 80"; elevation 75", shaft diameter 2 7/16". Arranged for belt drive on both sides, but without motor. Fan 60" in diameter; 8 arms and blades 30" wide.

SWEET'S STEEL COMPANY
Williamsport, Pa.

POWER PRESSES
BLISS, TOLEDO, V & O, ETC.
REBUILT—GUARANTEED
JOSEPH HYMAN & SONS
Tioga, Livingston and Almond Streets
Philadelphia, Pa.

---

2 Bliss No. 30N and No. 50N Geared Power Presses.
1 Bliss No. 3½ Toggle Drawing Press.
1 Ferracute No. EG-54 Knuckle Joint Press.
1 Pels No. 16 Combination Iron Worker, motor driven.
1 Blake & Johnson 12" x 12" Cold Rolling Mill.
6 Shuster Wire straightening & cutting machines.
3 Baird No. 1, No. 2 & No. 3 four slide wire machines.
1 Cleveland Double Crank Power Press, 6" stroke.

NATIONAL MACHINERY EXCHANGE
128-138 Mott St. New York, N. Y.

Brake, 10' x 10 ga. Ohl, press type
Bulldozer, No. 9 Williams-White
Gang Slitter, Braddock, 36" x 11 gauge
Press, No. 58 Toledo S.S., grd., 35,000 lbs.
Presses, Nos. 6 & 7A Niagara, OBI, grd.
Shear, No. 2120 Niagara, 10' x 14 ga.

RELIANCE MACHINERY SALES COMPANY
1403 Brighton Place, N.S., Pittsburgh, Pa.

Cameron No. 83 Automatic Bodymaker with Soldering Attachment.
Cameron No. 80-D Automatic Bodymakers.
Bliss No. 13 Automatic Bodymaker with Double-End Beading and Flanging Attachment.

ACME MACHINERY COMPANY
40 Elizabeth St., New York City

2—400 Amp. Hansen Gasoline Engine Driven Portable Welders.
1—Model 600 P. & H. Caterpillar Crane, 50 ft. boom, 39 in. magnet.
1—7½ ton P. & H. Overhead Traveling Crane, D.C. motors, 70 ft. span.
1—350 ft. and 1—500 ft. Ingersoll-Rand E.R.-1 Air Compressors.

MERTES MACHINERY COMPANY
1622 S. 1st Street Milwaukee, Wisconsin

F. H. CRAWFORD CO.
90 CHURCH ST.-NEW YORK
STEEL MILL EQUIPMENT

Bliss No. 22N Bodymaker with Soldering, Beading, Flanging Attachment.
Cameron No. 53 Automatic Seamer.
Bliss No. 12N Bodymaker—Beading and Flanging Attachment.
Bliss No. 225 Power Slitter.
Bliss No. 81 Double Seamer.
Bliss Automatic Strip Feed Presses.

R. & S. MACHINERY CO.
19 Howard St., New York City

WELDERS
300 amp. Lincoln A C & D C drive.
200 amp. G E, A C drive.
200 amp. Lincoln gasoline engine drive.
17 K V A. Thomson spot welder.
25 K W Thomson spot welder.
Many other arc welders and spot welders in stock.

Goodman Electric Machinery Co.
1060 Broad St. Newark, N. J.

THE CLEARING HOUSE

CHICAGO'S LARGEST & MOST COMPLETE STOCK

Electric Power Equipment

MOTORS	1000 HP Cro. Wheel. Syn. 600 rpm. 750 HP El. Mach'y Syn. 514 rpm. 500 HP Al. Chal. Slip'g 450 rpm. 200 HP Gen. Ele. Slip'g 600 rpm 150 HP Al. Chal. Squi-Cge. 720 rpm. 200 HP West. Squi-Cge. 1200 rpm. 100 HP G.E. Vert. Slip'g 900 rpm.
D. C. GEN	250 KW Westinghouse 600 rpm.
PLATERS	7500 Amp. H.V.-W. 6/12 volt. 4000 Amperes Burke 6/12 volt. 1500 Amperes Colum. 6/12 volt.
WELDER	500 Amperes Westinghouse.
AIR COMPR.	2600 CFM Sullivan Syn. Driv. 1100 CFM Bury Compressor. 870 Gardner-Denver 340 CFM Sullivan 260 rpm.
MOTOR GEN. SETS	750 KW West. Syn. 125/175 V. 500 KW Gen. Electric Synchronous 175 KW Synchronous Complete 150 KW Gen. Ele. Syn. Complete Many Others—All Capacity
TURBO GEN.	1250 KVA Westinghouse Condensing. (Many Others—Various Capacities)
TRANS-FORMERS	3—100 KVA Maloney 12m/460 volt. 1—54 KVA Kuhl. Dry 440-110/220.
ALTER-NATORS	1250 KW Ideal 1200 rpm. 750 KVA Cr. Wheel. 600 rpm. 500 KVA El. Mach'y 514 rpm. 375 KVA Gen. El. 225 rpm. 300 & 240 KVA G.E. 720 rpm.

Over Quarter Century Satisfactory Service
Send For Our Catalogue, It's Free

CHICAGO ELECTRIC CO.
1322 W. 22nd St. Chicago, Ill.

FOR SALE

GENERAL ELECTRIC TURBO ALTERNATOR

1250 KW, 3600 RPM, 2300 Volt, 3 Phase, 60 Cycle, Condensing Type with direct connected 125 volt exciter.

This unit is now in operation but will be released about February 1, 1938.

For Further Information and Inspection Address

ALUMINUM COMPANY OF AMERICA
SURPLUS & TRANSFER DIVISION
801 Gulf Building, Pittsburgh, Pa.

"Anything containing IRON or STEEL"

IRON & STEEL PRODUCTS, Inc.

BUYERS SELLERS TRADERS
Chicago (Hegewisch Sta.), Illinois
Phone South Chicago 9430

FOR SALE

CARS and LOCOMOTIVES
1—90-ton 0-8-0 Switcher, 15'6" W.B.
2—21-ton Porter S/T, 36" G.
1—40-ton 0-6-0 Baldwin Switcher, 9'9" W/B.

30 TON S. G. GAS • SWITCHING LOCO., AUTO. DUMP CARS, S. G. unless noted
36— 5-ton Western, 36" Steel, Ex. cond.
4—12-yd. Western, Wood, Fair condition.
24—12-yd. Western, Steel, Ex. cond.
12—20-yd. Western, 1920, Steel, Good cond.
16—20-yd. Magor, 1919, Steel, Ex. cond.
4—20-yd. Koppel, 1928, Steel, Ex. cond.
5—30-yd. Clark, Steel.
50—10,000 Gal. Tank Cars, Cheap.
Also Hoppers, Gons., Flat, Box, etc.

CAR REPAIR PARTS
Complete Shaft Mining Outfit. Send for list.
Nordberg track shifter.
STEEL Bridge, two sections 101' each.

6½ YD. BUCYRUS ELECTRIC SHOVEL BUILDINGS
62'x400' with crane runway.
New Shop Bldg., never erected. 445'x730'; five-section for 20-ton Cranes. Will split.
2—50'x300' Steel Sheds.
ALSO OTHER BUILDINGS.

CRANES: TRAVELING and POWER:
2—20-ton Whiting, OH.
1— 5-ton Whiting, OH.
1—Each, 10, 15 & 20-ton gantries.
1—1-yd. 301 Koehring Gas Cat. Crane.
1—10-ton Brownhoist 99s. crawler.
1—15-ton Brownhoist loco. type with Gen.
1—30-ton Browning, loco. type.
1—20-ton O&S, loco. type.
1—2-yd. Monighan dragline.
2—Mine Hoists, electric, 100 & 200 H.P.

NEW G. E. O. H. CRANE MOTORS
Replace your old ones cheaply!
9, 50 HP; 8, 25 HP; 7, 20 HP; 3/60/440.
Ball-bearing Slip-ring with Brakes & A-B controls.
HOWELL, AC, 9, 3; 6, 6; 5, 10; 3, 15 HP.
1, 300 KW, 600V DC Rotary Con. & Trans. 6 PH.

ENGINES, GENERATORS, ETC.
1—1000 KW G.E. con. Turbo-Gen. 3/60/2300.
3— 938 KVA non-con. Turbo-Gen. 3/60/2300.
3— 500 KW G.E. con. Turbo-Gen. 3/60/2300.
1—50 HP 1—20 HP, 1—5 HP steam.
1—each 30, 75, 100 & 150 KW DC eng.-gens.
2—120/175 HP Winton gasoline engines.
1—48" x 100' steel smoke stack.
150 KVA—3/60/220 Belted.

BOILERS, ETC.
2—350 HP, 4—500 HP B. & W. with super heaters & chain-grate stokers.
1—50 HP, 1—100 HP fire box.
2—2000 HP open feed Water Heaters.

AIR COMPRESSORS
1—1800 C.F. IR steam driven.
1— 888 C.F.—I.R. Type XB2 Belted.
1— 700 C.F.—I.R. Type IU steam.
2— 500 C.F. I.R. steam driven.

PUMPS
1—10" full manganese, gravel.
2—1000 GPM—350 FH Motor Driven.
1— 800 GPM—350 FH Motor Driven.
1— 500 GPM—450 FH. Turbine Driven.
1— 450 GPM—350 Turbine Driven.
15—Misc., elec. & steam.

MERCHANT NEW STEEL
35 tons Rounds & 5 tons Flats, Kansas.
11 tons SAE 3140 Half Rounds, Texas.

TINPLATE COBBLES
20-30-36 & 48" C.I. Pipe, Valves & Fittings.
Extra Heavy Steel Pipe, Valves & Fittings.
⅞" I.D.—1" O.D. Admir. Brass Tubing.
Send for our Bulletins

WANTED

MILLS and BLAST FURNACES
ELECTRIC MELTING FURNACES
STEEL BUILDINGS ANY LOCATION.
CRANES O. H., GANTRY LOCO. & TRACTOR.
CARS and LOCOMOTIVES
CAR REPAIR PARTS
SCRAP: TUNGSTEN BEARING
BUYERS SELLERS TRADERS
Send for our Adgit Pencil.

D.C. MOTORS—230 VOLTS

H. P.	MAKE	TYPE	SPEED
2—500	General Electric	MPC	180/350
1—400	Westinghouse	QS	450/675
1—400	General Electric	MPC	160/300
2—300	Westinghouse	SK	150/300
2—200	General Electric	DMC	300/600
1—125	Westinghouse	SK-210	225/900
1—125	General Electric	DMC	150/300
8—120	General Electric		300/900
1—100	Westinghouse	SK	475/1000
5— 60	Electro Dynamic	25-S	525/1050
6—40/50	Crocker Wheeler	EM	175/700
1— 35	Westinghouse	SK	500/1500
17— 25	General Electric	LC	650/1950
4— 10	Westinghouse	SK-90	500/1500
20— 7½	Westinghouse	SK-70	500/1500

Large Stock of FULLY GUARANTEED A.C. and D.C. MOTORS—GENERATORS—TRANSFORMERS—M.G. SETS and POWER PLANT MACHINERY.

BELYEA COMPANY, INC.
147 West 18th St. New York City.

USED STEAM AND ELECTRICAL EQUIPMENT

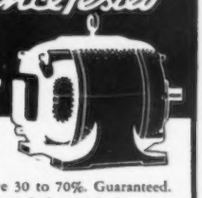
Steam Turbines, Motor Generator Sets, Belted and Direct Connected A.C. and D.C. Generating Units, Boilers, Rotary Converters, Motors, Transformers, Etc.

ARCHER & BALDWIN, INC.
75 West Street, New York
Tel.—BOwling Green 9-9275—9276

1 ton 220 volt D C Shepard Hoist.
40 KVA 220-3-60 alternator.
50 HP Wagner slip ring motor.
100 HP GE MT slip ring motor.
10 HP 220 D C Westinghouse SK 500/1500 motor.
50 HP new Westinghouse 220 volt D C automatic motor starter magnetic separator pulleys.

Goodman Electric Machinery Co.
1060 Broad St. Newark, N. J.

Performance Tested
MOTORS *are better*



• Modern type motors (AC and DC) rebuilt and tested to perform like new. Cost no more. Save 30 to 70%. Guaranteed. More than 6000 units in stock for quick shipment. Write, Wire, Phone!

THE MOTOR "REPAIR AND" MANUFACTURING CO.
1563 HAMILTON AVE. • CLEVELAND, OHIO

LOCOMOTIVE CRANE: Link Belt 15 Ton, 55 ft. Boom, 8 Wheels.
AIR COMPRESSOR: Ingersoll-Rand Type NEI 12¼x12, Belt Drive.
Located in East and priced extraordinarily low if purchased before removal to our warehouse.

DONAHUE STEEL PRODUCTS CO.
74th St. & Ashland Ave. Chicago, Ill.

ELECTRIC HOISTS — CRANES

Bought — Sold — Rented

ELECTRIC HOIST & MOTOR CO.
149 N. 9th ST. BROOKLYN, N. Y.

10 Electric Yard Cranes

1-25 ton 75' O.E.T. Crane.
1-75' Grab Bucket Crane.
1-5 ton 2 motor Shepard Hoist.
2-3 ton 2 motor Shepard Hoist.

N. B. PAYNE
105 W. 55th St., N. Y. Tel. Circle 7-6730

AIR COMPRESSORS

BELTED—176 ft., 355 ft., 540 ft.
676 ft., 752 ft. & 1300 ft.
ELECTRIC—355 ft., 528 ft., 676 ft.
807 ft., 1302 ft., 1728 ft.
2022 ft., 3600 ft. & 5000 ft.
STEAM—368 ft., 500 ft., 800 ft., 1221 ft., 1640 ft., 2200 ft. & 3000 ft.
DIESEL—368 ft., 603 ft., 900 ft. & 1300 ft.

R. C. STANHOPE, INC.
875 Sixth Ave. New York, N. Y.

"OVERHEAD CRANES & HOISTS"
I Own and Offer the Following:
1—7½-ton Morgan, 3-motor, 65' 0" span, 220 vo. D.C. Steel mill type.
2—5-ton Case, 3-motor, 65' 0" span, 220 vo. D.C. General Electric motors.
1—3-ton P. & H., 3-motor, 28' 0" span, 220 vo. 3 ph. 60 cy. cage controlled.
1—3-ton Northern, 16' 9" span, 3-motor, 220 vo. D.C. Low head room type.
JAMES P. ARMEL, 925 Fulton Bldg., Pittsburgh, Pa.

PRICE RIGHT FOR QUICK SALE

5-ton Shaw-Box OET CRANE, cage operated, span 38'10", vertical movement of main block 30 ft., 3 motors all Shaw-Box 220V DC.

SCULLY-JONES & COMPANY
(Fdry. Div.)
1903 So. Rockwell St., Chicago, Ill.

MODERN
AIR COMPRESSORS
All Types and Sizes
Rebuilt-Guaranteed
EARL E. KNOX COMPANY
8 West Second St. Erie, Pa.

OVERHEAD ELECTRIC CRANES
(2)—3-ton Shepard 32'0" span, 230-V.D.C.
5-ton Maris 28'2" span, 230-V.D.C.
5-ton Shepard 40'0" span, 230-V.D.C.
3-ton Chesapeake Gantry 50'0" span, 3-motor type, 220-440-V.A.C.
20-ton Northern 65'0" span, 230-V.D.C.
(10)—1 to 5 ton Shepard Electric Hoists.
All in stock, offered Rebuilt.
T. B. MacCABE CO.
Beury Bldg., Broad & Germantown Ave., Phila., Pa.

THE CLEARING HOUSE

SURPLUS MACHINERY AND MOTORS

	H.P.	Speed	Volts	Make	Price
2—400 3 ph.	60 cy.	500	2200	Westinghouse	$800
1—250 3 ph.	60 cy.	585	440	S.R. C.W.	450
5—15 D. C.		500/1000	550	G.E.	290
2—20 D. C.		500/1000	550	G.E.	340
1—Rock River Punch 48" Throat, Architectural Jaw. Price					850
1—50-Ton Industrial Bay City Wreck Crane					4,500
1—20-Ton Browning Loco. Crane.....					4,000
1—25-Ton Industrial Bay City Loco. Crane					5,000
1—20-Ton McMyler Loco. Crane.....					4,000
1—15-Ton Browning Loco. Crane.....					3,500
1—15-Ton Morgan Bridge Crane 68' Span					
1—10-Ton Toledo Ore Crane 1½ yd. Bucket 60' Span					

HUNTER STEEL COMPANY

3200 Grand Avenue, Neville Island — Phone Federal 4300, Pittsburgh, Penna.

ALBERT & DAVIDSON PIPE CORP.

PIPE

NEW-USED-UNTESTED

2nd Ave. 50th-51st St. *Est. 1904* Brooklyn, N.Y.

Second Hand Wrought Iron and Steel **PIPE** Overhauled Rethreaded Coupled

All Sizes in Stock

Greenpoint Iron & Pipe Co., Inc.

Stagg & Bogart Sts., Brooklyn, N. Y.

EQUIPMENT

26—12 yd. Western Air or Hand Dump Cars
11—50 ton 40 ft. Flat Cars
8—50 ton 40 ft. Steel Gondolas
22—50 ton Steel Hopper Coal Cars
1—25 ton Browning Locomotive Crane
1—20 ton Ohio Locomotive Crane
2—40 ton Baldwin 4-Driver S.T. Locomotives
12—5 yd. 36" ga. Western Dump Cars
3—1½ yd. 36" ga. Koppel V Dump Cars
Cars and Locomotives of all types.

HYMAN-MICHAELS CO.

20 N. Wacker Drive Bldg., Chicago

Ry. Exchange Bldg., St. Louis, Mo. — 101 West 31st St., New York

LIFTING MAGNETS

22" 36" 43" 55"

We furnish completely rewound magnets guaranteed one year.
We buy, sell, rent and repair magnets.

GOODMAN ELECTRIC MACHINERY CO.

1060 Broad St. — Newark, N. J.

RAILS "1 Ton or 1000"

NEW RAILS—5000 tons—All Sections—All Sizes.
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.
ACCESSORIES—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.
Buy from One Source—Save Time and Money. 'Phone, Write or Wire.

L. B. FOSTER COMPANY, Inc.

PITTSBURGH NEW YORK CHICAGO

RELAYING RAILS

2,000 tons 80# ASCE, complete with angle bars.
2,000 tons 60# ASCE and PRR sections, complete with angle bars. Ready for immediate shipment.

M. K. FRANK

480 Lexington Ave., New York City — 450 Fourth Ave., Pittsburgh, Pa.

WANTED • • WANTED • • WANTED

WANTED

Boring Mill 30 ft. Diameter
Must be in good condition

Mail description and price immediately.

Treadwell Construction Co.
MIDLAND, PA.

WANTED TO PURCHASE a 1000 to 1200 H.P., 2300 V., 3 phase, 60 cycle electric motor; either slip-ring or synchronous, synchronous preferred. Quotations should state power factor, pull-in and pull-out torque, age, condition and other pertinent information.

SWEET'S STEEL COMPANY
Williamsport, Pa.

MIDLAND STEEL & EQUIPMENT CO.
400 South Clinton Street, Chicago, Illinois

The Largest Buyers of Surplus Steel Inventories

WANTED

Bliss No. 14 Bodymaker
Bliss Flanger
Bliss Seamers

Address Box S-506
Care *The Iron Age*, 239 W. 39th St., New York

WANTED TO BUY

High Speed Steel

SCRAP

CHICAGO ALLOY PRODUCTS CO.
712 Liberty St. — Chicago, Ill.

WANTED
Your Inquiries and Offerings
and perusal of our detail advertisement on page 111 of the Classified Section.
It may "pay" you to do so!
IRON & STEEL PRODUCTS, INC.
Chicago (Hegewisch Sta.), Illinois
Phone South Chicago 9430
"Anything containing IRON or STEEL"

Wanted one used SHEET ROLLER LEVELER between 48 inch and 72 inch. State price, age, make, physical condition and delivery.

Address Box S-505
Care *The Iron Age*, 239 W. 39th St., New York

WANTED TO BUY
SURPLUS AND OBSOLETE LOTS
SHEET STEEL, TINMILL
PRODUCTS, STRIP STEEL
ADDRESS BOX S-249
Care *The Iron Age*, 239 W. 39th St., New York

Specific "Wants"
Quickly Filled

When you are in the market for something that's hard to locate, advertise for it here. It's a quick and almost sure way to find what you want. USE IT.

CONTRACT MANUFACTURING

STAMPINGS

Light and Medium, in any quantity, complete assemblies, also case hardening, prompt service, reasonable prices.

SPECIAL HARDWARE CO.
MEDFORD, N. Y.

SCREW MACHINE PRODUCTS
OF EVERY DESCRIPTION
SMALLEST UP TO 2¼"
HARDWARE SPECIALTIES

OLSON MFG. CO.
Worcester, Mass.

HOT DIP GALVANIZING

We have the largest hot dip galvanizing plant and kettles in the United States. We have the most modern equipment to do first class galvanizing at lowest prices. Prime Western Zinc used exclusively. Galvanized products furnished.

Send Us Your Inquiries

Joseph P. Cattie & Brothers
Gaul and Letterly Streets
Philadelphia

STAMPINGS

Light and Medium
Electric Spot Welding and Assembled Units

We specialize in designing stampings to substitute castings. Dies designed and built for quantity production.

Eastern Tool & Stamping Co., Inc.,
39 Ballard Street, Saugus, Mass.

ALLOY IRON CASTINGS
a specialty
CONTRACT MACHINE WORK
requiring large machine tools

MURRAY IRON WORKS COMPANY
BURLINGTON, IOWA

BUSINESS OPPORTUNITIES

ELECTRIC MELTING FURNACES

Advertisers wish to dispose of United States and Canadian rights for license and control to build in these countries special type electric 3-phase arc Furnaces having hydraulic regulators, electric mixers and other equipment. Special advantages of these furnaces and European backing will be given.
Those interested, who wish to negotiate, write Metalectric Furnaces, Ltd., Cornwall Road, Smethwick, Birmingham, England.

PLANT LIQUIDATION

All equipment of Canton Car Co., Canton, Ohio: Punches, Plate Shears, Scrap Shears, Direct connected synchronous motor driven Air Compressors, Electric Shop Trucks, Hoists, Etc. Write for complete list and prices.

POST OFFICE BOX 1257
HAMMOND, INDIANA

Procurement Division, Public Buildings Branch, Washington, D. C., Dec. 11, 1937.—Sealed proposals in duplicate will be publicly opened in this office at 1 P. M., Jan. 14, 1938, for construction of the U. S. P. O. at Phoenix City, Ala. Upon application, one set of drawings and specifications will be supplied free to each general contractor interested in submitting a proposal. The above drawings and specifications MUST be returned to this office. Contractors requiring additional sets may obtain them by purchase from this office at a cost of $5 per set, which will not be returned. Checks offered as payment for drawings and specifications must be made payable to the order of the Treasurer, U. S. Drawings and specifications will not be furnished to contractors who have consistently failed to submit proposals. One set upon request, and when considered in the interests of the Government, will be furnished, in the discretion of the Assistant Director, to builders' exchanges, chambers of commerce or other organizations who will guarantee to make them available for any sub-contractor or material firm interested, and to quantity surveyors, but this privilege will be withdrawn if the sets are not returned after they have accomplished their purpose. W. E. Reynolds, Assistant Director of Procurement, Public Buildings Branch.

GET IN THE HABIT

of reading and using the classified sections — they are full of opportunities.

We are considering adding one major account. This is a very successful industrial selling and engineering organization in the Chicago metropolitan territory. Product must be high-grade industrial or steel mill equipment. We have led the field in sales this year with the two accounts we now represent.

Address Box S-499
Care *The Iron Age*, 239 W. 39th St., New York

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

SALARIED POSITIONS $2,500 to $25,000

This thoroughly organized advertising service of 28 years' recognized standing and reputation carries on preliminary negotiations for positions of the calibre indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details.

R. W. BIXBY, Inc.
274 Delward Bldg., Buffalo, N. Y.

HIGH GRADE MEN

Qualified candidates desiring salaried positions are invited to use our individual and confidential services in contacting responsible employers. We negotiate all preliminary overtures.
Established 1915
THE NATIONAL BUSINESS BOURSE
H. H. Harrison, Director
20 W. Jackson Blvd., Chicago

HELP WANTED

PRODUCTION MANAGER WANTED by Manufacturer of special machinery and machine tools, capable of planning and controlling production, and coordinating operations of different manufacturing departments. Must have mechanical and engineering training, and the ability and personality to accomplish results efficiently and harmoniously. To the right man this is an unusual opportunity, in congenial surroundings. Location New York State. Give full particulars as to experience and responsibilties, with whom and for how long; also age and compensation expected. Communications considered confidential. Address Box S-508, care *The Iron Age*, 239 W. 39th St., New York.

WANTED: DIRECT OR MANUFACTURER'S AGENT thoroughly familiar with the sale of merchant steel pipe in any one of the following territories: Los Angeles, St. Paul, New Orleans, Cleveland and Chicago. Address Box S-496, care *The Iron Age*, 239 W. 39th St., New York.

HELP WANTED

WANTED—PRODUCTION MAN. To superintendents or assistant superintendents of first class plants making heavy machinery and who have proven themselves real producers we offer an unusual opportunity. Must be A-1 mechanic between 35 and 40 and have thorough knowledge of machine shop operations, plate and sheet metal forming and welding. Foundry and pattern shop experience helpful but not essential. Do not waste postage answering unless you fill above specifications. To receive consideration, give in first letter, your age, education, training, places employed, lengths of service and salary expected. All replies in absolute confidence. Address Box S-495, care *The Iron Age*, 239 W. 39th St., New York.

A JOBBER OF TIN PLATE, Black and Galvanized sheets, who is expanding and intends to carry a full line of Strip Steel, desires the services of two salesmen, one who has experience in Tin Plate and Sheets and one who is acquainted in the metropolitan district with the users of Strip Steel. Those who qualify will make excellent connections. State qualifications. Address Box S-503, care *The Iron Age*, 239 W. 39th St., New York.

WANTED EXPERIENCED TRADER. An honest intelligent man of good reputation with best references can make connection with high grade concern, Pittsburgh District. Must be a good trader who has scrap iron brokerage experience and good connections. Give full record, experience and education. Address Box S-509, care *The Iron Age*, 239 W. 39th St., New York.

SITUATIONS WANTED

MANUFACTURING AND SALES EXECUTIVE WITH PROPER BACKGROUND OF EDUCATION, TRAINING AND EXPERIENCE IN VARIED FIELDS HAS JUST BECOME AVAILABLE. OUTSTANDING REFERENCES. ADDRESS BOX S-507, CARE *THE IRON AGE*, 239 W. 39TH ST., NEW YORK.

PERSONNEL DIRECTOR; SEASONED EXECUTIVE; mechanical engineer familiar all phases manufacturing; employment; vestibule training; welfare; safety; hospitalization; insurance; incentives; wage systems. Address Box S-481, care *The Iron Age*, 239 W. 39th St., New York.

SITUATIONS WANTED

EXECUTIVE AVAILABLE

A young, vigorous-minded executive is available for position where the solution of a business problem requires experience and abilities involving knowledge of management activities. This man is profit-minded. He believes in approaching a problem through sales—which means first finding out the desires of the consumer and then developing the most efficient use of facilities and personnel to earn the best profit for the stockholders. Grounded in markets, research technique, marketing and promotion and advertising, personnel work and general business management and policies. Officer of large corporations. Engineering graduate. Intimate knowledge of capital goods businesses as well as experience with consumer outlets.

ADDRESS BOX S-504
Care The Iron Age, 239 W. 39th St., New York

Profit by using
THE CLASSIFIED SECTIONS
of The Iron Age

ADVERTISERS INDEX

A

Acme Machinery Co. 110
Albert & Davidson Pipe Corp. ... 112
Aluminum Co. of America 111
American Chemical Paint Co. ... 104
American Hollow Boring Co. 92
American Monorail Co., The 50
American Optical Co. 85
American Rolling Mill Co., The. 4
American Steel & Wire Co. 14-15
American Steel Export Co., Inc. 91
American Welding & Mfg. Co. .. 92
Archer & Baldwin, Inc. 111
Armel, James P. 111
Armstrong-Blum Mfg. Co. 89
Armstrong Bros. Tool Co. 89
Athenia Steel Co., The 86
Atlas Drop Forge Co. 93

B

Baird Machine Co., The 87
Baltimore Malleable Iron & Steel Casting Co. 93
Bardons & Oliver 89
Beatty Machine & Mfg. Co. 90
Belmont Iron Works 97
Belyea Co., Inc. 111
Bennett-Rafkin Mchry. Corp. ... 108
Bethlehem Steel Co. 20
Bixby, R. W., Inc. 113
Bradley, C. C. & Son, Inc. 99
Brassert, H. A., & Co. 97
Buffalo Mchry. Co., Inc. 107, 108
Buffalo Wire Wks. Co., Inc. 105
Business Opportunities Section .. 113

C

Canton Fdry. & Mach. Co. 95
Carnegie-Illinois Steel Corp. 10-11
Cattie, Joseph P., & Bros. 112
Champion Sheet Metal Co., Inc. 94
Cheney, S. & Son 93
Chicago Alloy Products Co. 112
Chicago Electric Co. 111
Chicago Perforating Co. 98
Cincinnati Bickford Tool Co., The 52
Cincinnati Machinery & Supply Co. 107
Clearing House Section 107-112
Cleveland Steel Tool Co., The .. 89
Cleveland Tool & Supply Co., The 91
Columbia Steel Co. 10-11-14-15
Conco Engineering Works 95
Cone Automatic Mach. Co., Inc. 86
Contract Manufacturing Section 112
Crawford, F. H., & Co., Inc. ... 110
Crosby Co., The 86
Crucible Steel Casting Co. 93

D

Detroit Hoist & Machine Co. ... 96
Donahue Steel Prods. Co. ...110, 111
Dony, D. E., Mchry Co. 108
Dreis & Krump Mfg. Co. 90

E

Earle Gear & Mach. Co. 96
Eastern Machine Screw Corp., The 89
Eastern Tool & Stpg. Co., Inc. .. 112
Edge Hill Silica Rock Co. 99
Electric Hoist & Motor Co. 111
Employment Exchange Section .. 113
Erie Foundry Co. 53
Espen-Lucas Mach. Wks., The .. 89
Essley, E. L., Mchry. Co., The .. 108

F

Fairmount Foundry, Inc. 94
Federal Bearings Co., Inc., The. 13
Flinn & Dreffein Co. 97
Foster, L. B., Co., Inc. 112
Frank, M. K. 112
Freeman, Samuel T. & Co. 109

G

Gibson, Wm. D. Co., Div. of Associated Spring Corp. 101
Goodman Electric Machinery Co. 110-111-112
Goodrich, B. F., Co., The 7
Goss & DeLeeuw Mch. Co. 88
Grammes, L. F., & Sons, Inc. ... 94
Great Lakes Steel Corp. 12
Greenpoint Iron & Pipe Co., Inc. 112
Griffin Mfg. Co., Inc. 91

H

Harnischfeger Corp. 95
Harrington & King Perforating Co., The 59
Hassall, John, Inc. 99
Hayward Co., The 95
Hendrick Mfg. Co. 98-104
Hill-Clarke Mchry. Co. 109
Hindley Mfg. Co. 104
Holden A. F., Co. .....Front Cover
Hubbard, M. S., Spring Co. 101
Hunter Steel Co. 112
Hyde Park Fdry. & Mch. Co. 98
Hyman, Joseph, & Sons 110
Hyman-Michaels Co. 112

I

Indianapolis Mchry. & Supply Co., Inc. 110
Industrial Machinery Co. 108
Inland Steel Co. 17
International Business Machines Corp. 87
Iron & Steel Prods., Inc. 111-112
Iroquois Machinery Co. 108

K

Knox, Earl E., Co. 111

L

Laclede Steel Co. 91
Laconia Malleable Iron Co., Inc. 93
Lake City Malleable Co., The Back Cover
Land, L. J. 110
Landis Machine Co., Inc. 18
Lansing Stamping Co. 94
Latrobe Electric Steel Co. 92
Lee Spring Co., Inc. 86
Leland-Gifford Co. 86
Leschen, A., & Sons Rope Co. ... 58
Lillie, Dexter P., & Co. 104
Lucas Mch. Tool Co., The 86
Ludlum Steel Co. 3

M

MacCabe, T. B., Co. 111
McCabe Mchry. Co. 108
Malleable Iron Fittings Co. 93
Maris Brothers, Inc. 96
Marr-Galbreath Machinery Co. .. 110
Merrell Mfg. Co. 89
Mertes Machinery Co. 110
Metalectric Furnaces, Ltd. 113
Midland Steel & Equip. Co. 112
Miles Mchry. Co. 108
Monarch Machinery Co. 107
Morey Mchry. Co., Inc. 108
Motor Repair & Mfg. Co. 111
Moyer, J. N. 110
Mundt, Chas., & Sons 98
Murray Iron Wks. Co. 112

N

National Business Bourse 113
National Machinery Exchange ... 110
National Steel Corp. 12
New Albany Machine Mfg. Co. ... 90
Nilson, A. H., Mch. Co. 97
Northern Engineering Works 59

O

O'Brien Mchry. Co., The 108
Ohio Locomotive Crane Co., The 95
Olson Mfg. Co. 112
Ottemiller, Wm. H., Co., Inc. 100

P

Parker-Kalon Corp. 100
Payne, N. B. 111
Pittsburgh Crushed Steel Co. 99
Pittsburgh Lectromelt Furnace Corp. 97
Poor & Co., Canton Forge & Axle Works 92
Pratt & Whitney Div. Niles-Bement-Pond Co. 44
Prentiss, Geo. W., & Co. 104
Progressive Mfg. Co., The 100

R

R & S Machinery Co. 110
Reliance Machinery Sales Co. 110
Ridgway, Craig, & Son Co. 95
Ritterbush & Co., Inc. 107
Robbins & Myers, Inc. 96
Rockford Drop Forge Co. 92
Rosenkranz, Weisbecker & Co., Inc. 107
Ryerson, Jos. T., & Son, Inc. 92

S

Samuel, Frank, & Co., Inc. 104
Scaife, Wm. B., & Sons Co. 96
Screw Machine Products Corp. .. 100
Scully-Jones & Co. 111
Seneca Wire & Mfg. Co., The .. 105
Sessions, J. H., & Son 95
Simmons Mch. Tool Corp. 107
Simonds Mfg. Co., The 96
Special Hardware Co. 112
Standard Pressed Steel Co. 100
Stanhope, R. C., Inc. 111
Stanley Works, The 91
Strand, N. A., & Co. 89
Superior Steel Corp. 49
Sweet's Steel Co. 110-112
Swift Electric Welder Co. 56

T

Tennessee Coal, Iron & Railroad Co. 10-11
Thomas Machine Mfg. Co. 57
Thomson-Gibb Elec. Welding Co. 99
Timken Roller Gearing Co., The Inside Back Cover
Torrington Co., The 97
Treadwell Construction Co. 112
Treasury Dept. 113
Tupholme Co. 107

U

U. S. Steel Corp. Subsidiaries 10-11-14-15
U. S. Steel Products Co. .10-11-14-15
U. S. Steel Wire Spring Co. 104

V

V & O Press Co., The 90
Vanadium Corp. of America 6

W

Wanted Section 112
Warner & Swasey Co. 5
Webb Wire Wks., The 105
Weldit Acetylene Co. 57
West Penn Machinery Co. 110
Westinghouse Electric & Mfg. Co. 8-9
Wetherell Bros. Co. 91
Whiting Corp. 95
Worcester Stamped Metal Co. 94
Worth Steel Co. ..Inside Front Cover
Wyckoff Drawn Steel Co. 51

Z

Zeh & Hahnemann Co. 90

CLASSIFIED SECTION

Business Opportunities 113
Clearing House 107-112
Contract Manufacturing 112
Employment Exchange 113
Wanted 112

New Industrial Literature 16

DEC 30 1937

THE IRON AGE
DECEMBER 30, 1937

Holden Hard Case

Proves its Merit Over a 4-year Period

Check your costs

Test its performance

WHAT DO YOU MAKE

- AUTOMOBILES
- ELECTRIC REFRIGERATORS
- TRACTORS
- MACHINERY
- GEARS
- TABULATING MACHINES
- GUN BOLTS
- TALKING MACHINES
- CASH REGISTER PARTS
- AIRPLANE MOTORS
- CLOCKS
- SPEEDOMETER GEARS
- ROLLER BEARINGS
- BICYCLES
- RADIO PARTS
- OUTBOARD MOTORS

For each and every one HOLDEN Hard Case *means*

A SHORTER TIME CYCLE

GUARANTEE

Holden Engineers can save you $500 to $5,000 in the next 12 months

One of the big motor makers discovered this:

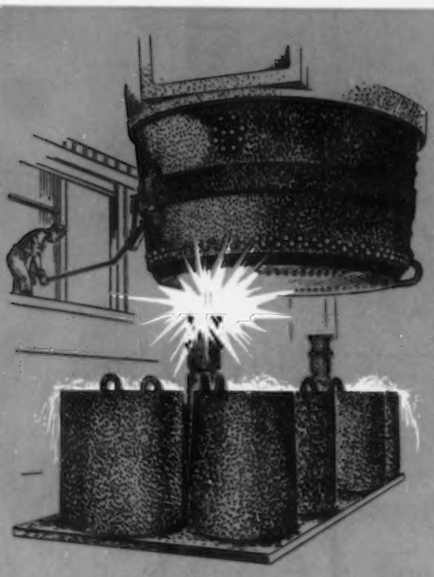
Special shafts requiring the utmost in quality and precision are now Heat Treated in Holden Hard Case, attaining the desired depth of case .032 inches, in an hour faster time. This saving in time means an important reduction in costs.

WRITE OR WIRE TODAY

A. F. HOLDEN COMPANY

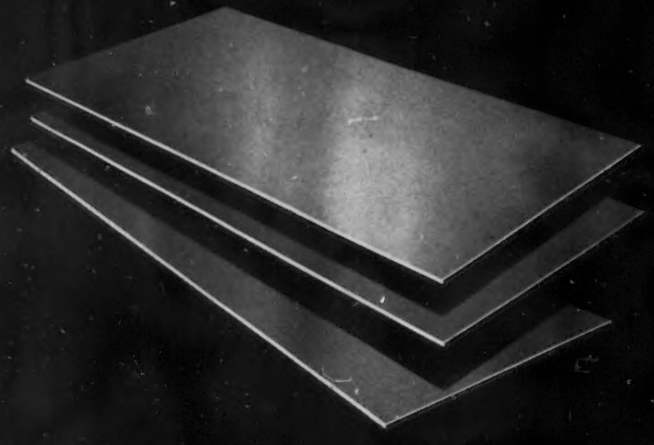
NEW HAVEN, CONN.

Developers of Heat Treating Baths



WORTH SHEARED STEEL PLATE

We suggest: before you release your next order, investigate WORTH SHEARED STEEL PLATE and WORTH Facilities. You'll find Quality unsurpassed, a Plant completely qualified—and Service that is prompt, efficient and courteous. Our NEW CATALOG free to you, upon request. No obligation.



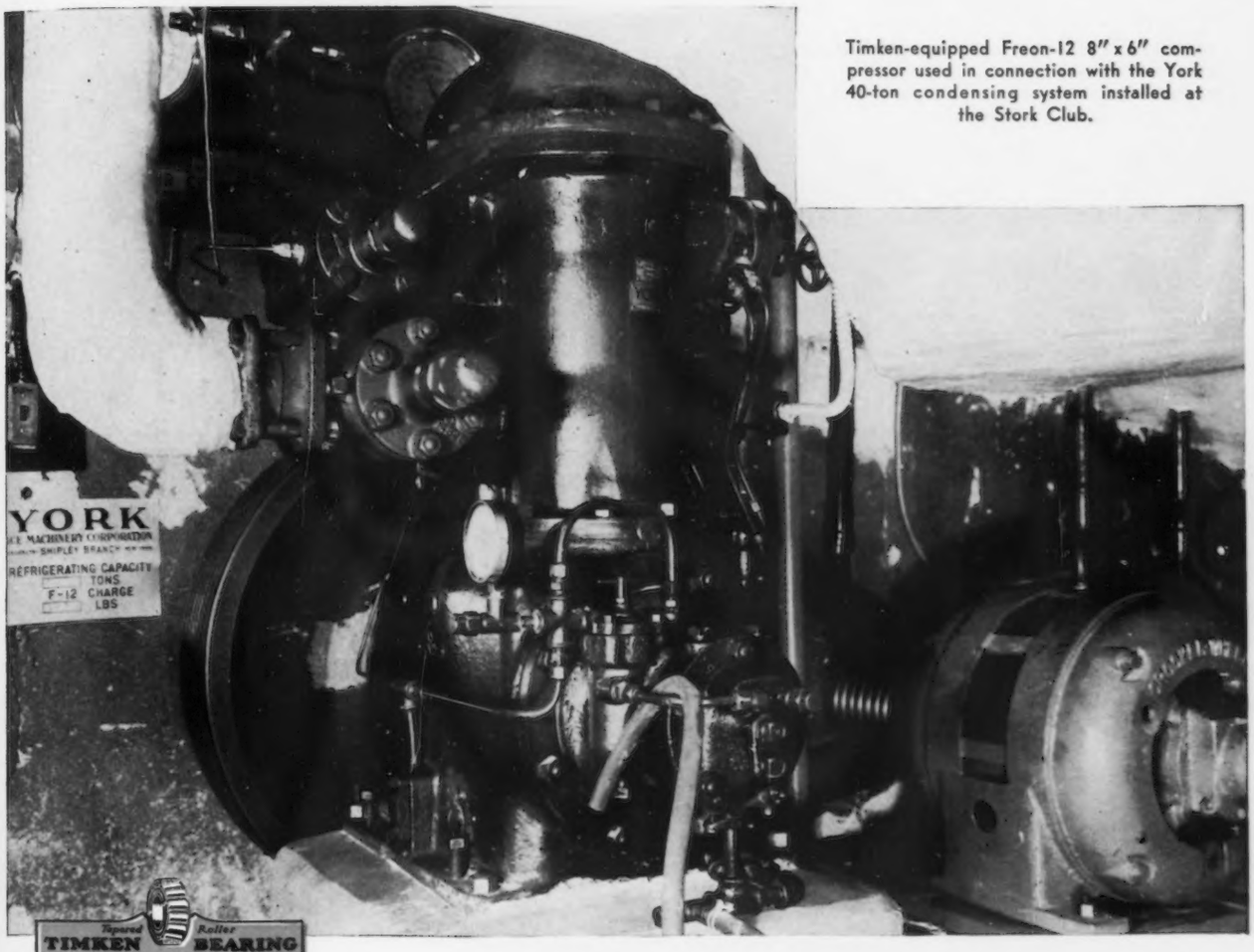
"CONTROLLED QUALITY . . . . from ingot to Finished Material!"

WORTH STEEL COMPANY CLAYMONT, DEL.

CALL THE NEAREST REPRESENTATIVE

New York, N. Y., Wm. C. Dickey • Pittsburgh, Pa., McKee-Oliver, Inc. • St. Louis, Mo., Hubbell & Sharp • San Francisco, Calif., W. S. Hanford • Boston, Mass., Edward H. Lloyd • Chicago, Ill., Theo. L. Dodd & Co. • Houston, Texas, The Corbett Corp. • Seattle, Wash., W. C. Scott, Jr. • Los Angeles, Calif., Ducommun Metals & Supply Co. • Cleveland, Ohio, E. F. Bond • Detroit, Mich., H. L. Sevin Montreal and Toronto, Canada, Drummond, McCall & Cot., Ltd.

THE IRON AGE, published every Thursday by the *CHILTON CO. (INC.)*. Publication Office, Chestnut & 56th Sts., Philadelphia, Pa. Editorial and Executive Offices, 239 W. 39th St., New York, N. Y. Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. $6.00 a year in U. S., Canada $8.50, Foreign $12.00. Vol. 140, No. 27.



Timken-equipped Freon-12 8″ x 6″ compressor used in connection with the York 40-ton condensing system installed at the Stork Club.

Tapered Roller TIMKEN BEARING EQUIPPED

A symbol of quality for any piece of equipment with which it is associated

AT NEW YORK'S SMART STORK CLUB

The Rock Island "Rockets" Roll On TIMKEN Bearings

GLIDE—as you ride a Timken-equipped train

Modern air conditioning is just as desirable in the fashionable night spots as it is in offices, stores, factories, theaters or any other place where people work or play.

A fundamental quality of all air-conditioning equipment—wherever it may be installed—is dependability. In any refrigerating system the compressor is the key to dependable performance, economy, low maintenance cost and long life. Mounting the crankshafts on TIMKEN Bearings assures better operating compressors because friction is eliminated; crankshaft wear is prevented; crankshafts are fully protected against radial, thrust and combination loads; and permanently held in exact alignment.

When buying air conditioning systems or individual compressors of any type—air or gas—it will pay you to ask this question: "Is the crankshaft Timken-equipped?" and be guided by the answer.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

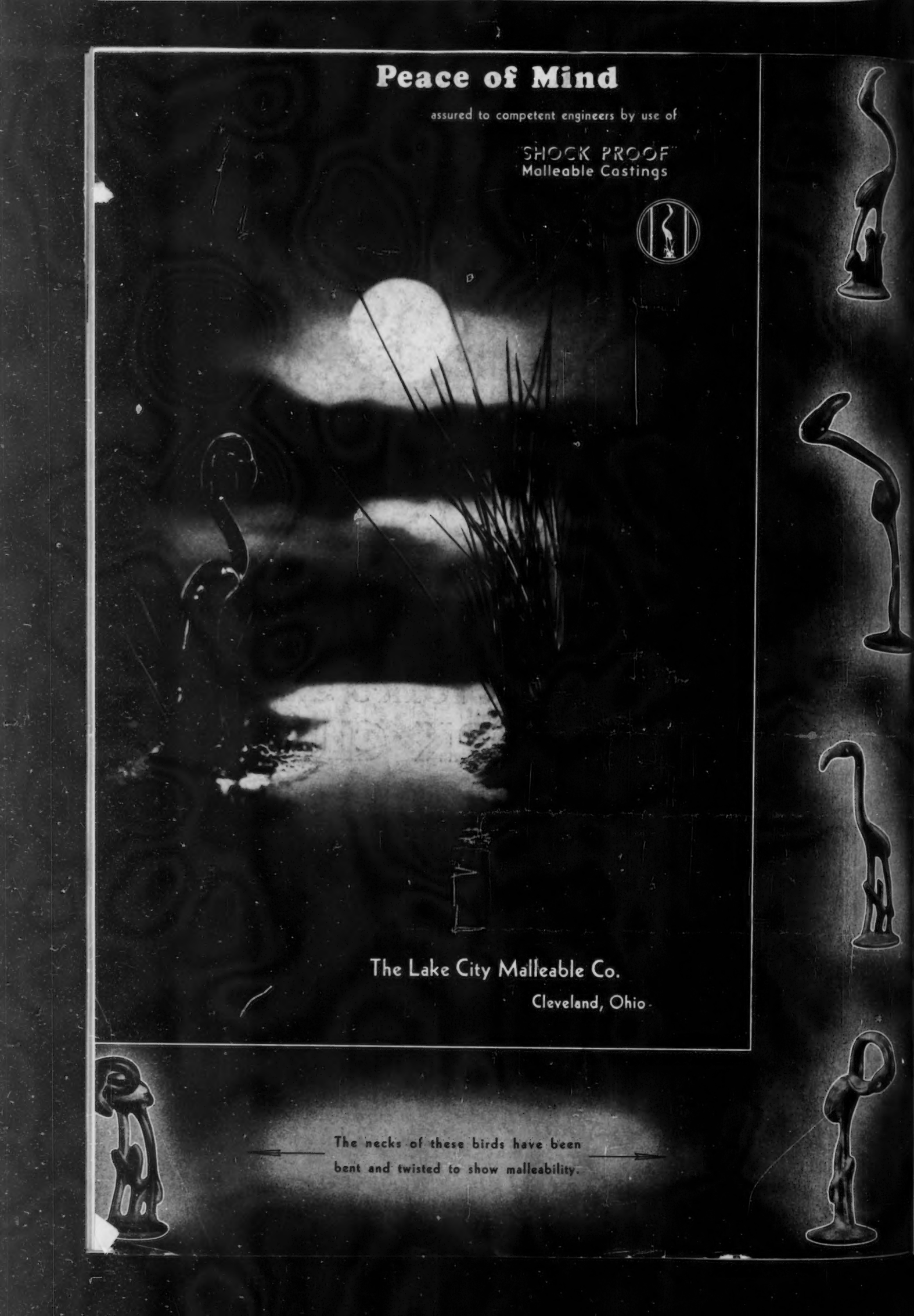
Manufacturers of Timken Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; Timken Alloy Steels and Carbon and Alloy Seamless Tubing; Timken Rock Bits: and Timken Fuel Injection Equipment.

TIMKEN
TAPERED ROLLER BEARINGS

Peace of Mind

assured to competent engineers by use of

SHOCK PROOF
Malleable Castings



The Lake City Malleable Co.
Cleveland, Ohio

The necks of these birds have been bent and twisted to show malleability.